

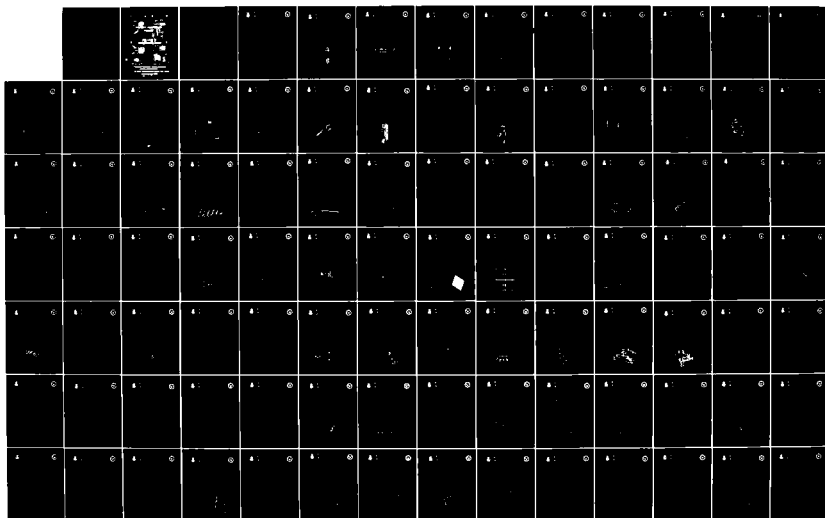
AD-A126 541 PATENT ABSTRACT DIGEST VOLUME 1(VI) AIR FORCE SYSTEMS  
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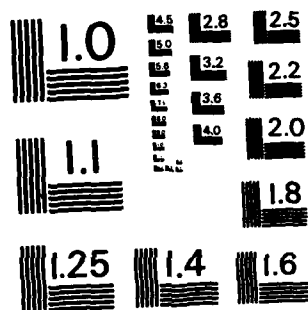
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

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United States Patent in 4,1982  
12, 1982

United States Patent in 4,1982  
12, 1982

# PATENT ABSTRACT DIGEST

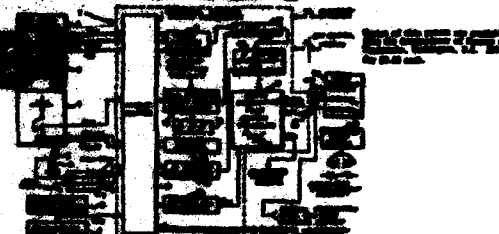


FIG. 1

FIG. 2

FIG. 3

## VOLUME IV NOVEMBER 1982

United States Patent in 4,1982  
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12, 1982

FIG. 4

FIG. 5



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NEW GOVERNMENT REGULATIONS ARE DESIGNED TO PROMOTE FASTER COMMERCIAL USE OF GOVERNMENT GENERATED TECHNOLOGY BY ENABLING PATENT LICENSES TO BE GRANTED. AIR FORCE REGULATION 110-33 PRESCRIBES THE POLICIES, ADMINISTRATIVE REQUIREMENTS, PROCEDURES, TERMS AND CONDITIONS FOR LICENSING AIR FORCE INVENTIONS. SECTION C, PARAGRAPH 11, REQUIRES THE AIR FORCE TO PUBLISH A LIST OF INVENTIONS AVAILABLE FOR LICENSING IN THE FEDERAL REGISTER, THE OFFICIAL GAZETTE OF THE U.S. PATENT AND TRADEMARK OFFICE, AND AT LEAST ONE OTHER PUBLICATION. WE CONCLUDED THAT BARE NOTIFICATION BY TITLE IN THE FEDERAL REGISTER WOULD NOT GO VERY FAR IN STIMULATING COMMERCIAL USERS OF AIR FORCE GENERATED INVENTIONS. THE PATENT ABSTRACT IS THE NEXT STEP UP THE PROMOTIONAL LADDER SUGGESTED IN THE 1971-1972 ANNUAL REPORT ON GOVERNMENT PATENT POLICY AND AIR FORCE REGULATION 110-33.

RECENT LEGISLATION HAS ADDED ADDITIONAL GOVERNMENT EMPHASIS ON THE DISSEMINATION OF GOVERNMENT GENERATED TECHNOLOGY. WE BELIEVE THAT DISSEMINATION OF THE RESULTS OF AIR FORCE R&D PROGRAMS DESCRIBED IN THESE ISSUED U.S. PATENTS WILL HELP REDUCE THE POSSIBILITY OF "RE-INVENTING THE WHEEL" AND THUS SAVE GOVERNMENT R&D FUNDS.

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*Gordon A. Ginsburg*  
GORDON A. GINSBURG  
BRIGADIER GENERAL, USAF  
STAFF JUDGE ADVOCATE



# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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**United States Patent** [19]

[11] **4,271,396**

**Brown**

[45] **Jun. 2, 1981**

**[54] INCIDENT RADIATION  
ABSORBER/REFLECTOR ASSEMBLY**

[75] Inventor: Donald G. Brown, Newbury Park, Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 1,330

[22] Filed: Jan. 5, 1979

[51] Int. Cl.<sup>3</sup> ..... H07S 3/08

[52] U.S. Cl. .... 331/94.5 C

[58] Field of Search ..... 331/94.5 C, 94.5 D;  
350/293, 96.1, 294, 299; 126/438, 439

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

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Primary Examiner—William L. Sikes

Assistant Examiner—Leon Scott

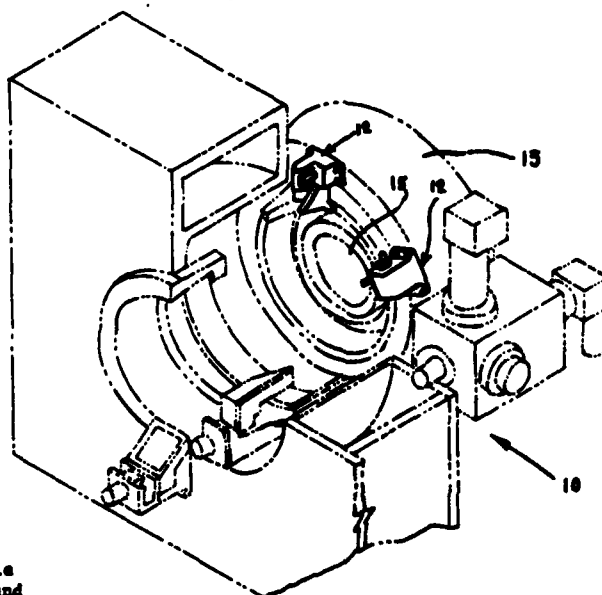
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

**[57] ABSTRACT**

An incident radiation absorber/reflector assembly having a mounting housing to which is adjustably secured an absorber body and a reflector element. An entrance opening, aligned with the reflector element, is formed within the body. The entrance opening is connected to a cylindrical cavity within the body by a tapered passageway which is offset from the longitudinal axis of the cavity. Any incident radiation intercepted by the reflector element is directed by the reflector element into the cavity where it is substantially absorbed by the absorber body.

**9 Claims, 3 Drawing Figures**

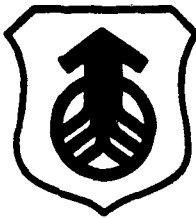
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**JAT 00312**



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,273,026

Walter

[45] Jun. 16, 1981

[54] GUN ALIGNMENT ADJUSTING DEVICE

[75] Inventor: Albert F. Walter, Fort Worth, Tex.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 63,499

[22] Filed: Aug. 3, 1979

[51] Int. Cl. .... F41F 19/00

[52] U.S. Cl. .... 89/37 R; 89/37.5 C

[58] Field of Search .... 89/37 R, 37 B, 37 E,  
89/37 K, 37.5 C, 41 A

[56] References Cited

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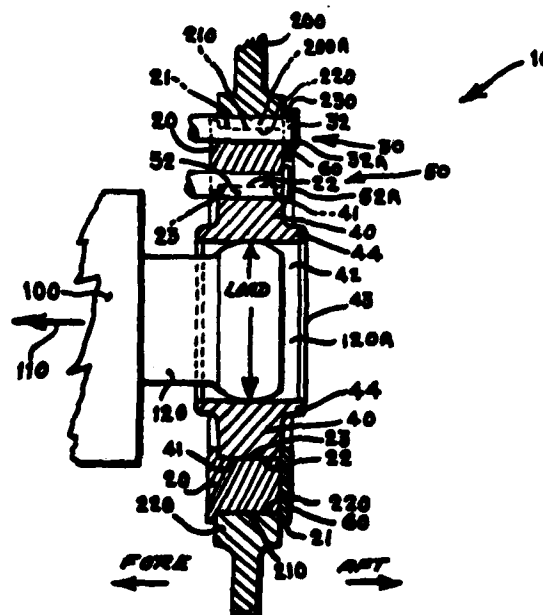
Primary Examiner—Stephen C. Bentley  
Attorney, Agent, or Firm—Donald J. Singer, Arsen  
Tashjian

[57] ABSTRACT

A device for mechanically adjusting a gun with respect to a separate sighting means. The gun has a gimbal mounting and a double eccentric mounting arrangement, whereby the gun can be adjusted or aligned to a specific relationship with the sight, and once adjusted, can be locked to maintain such adjusted position.

8 Claims, 9 Drawing Figures

Requests for licensing information should be addressed to:  
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JAT 00313



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,273,183

Altoz et al.

[45] Jun. 16, 1981

[54] MECHANICAL HEAT TRANSFER DEVICE

[75] Inventors: Frank E. Altoz, Catonsville; William H. Winn, Linthicum, both of Md.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 62,592

[22] Filed: Jul. 31, 1979

[51] Int. Cl.<sup>3</sup> ..... F28F 27/00

[52] U.S. Cl. .... 165/32; 165/44;  
165/185

[58] Field of Search ..... 165/32, 185, 44

[56] References Cited

## U.S. PATENT DOCUMENTS

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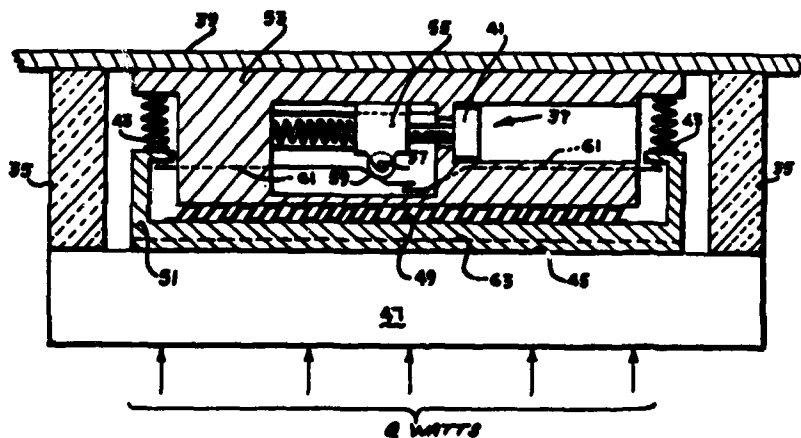
Primary Examiner—Albert W. Davis  
Attorney, Agent, or Firm—Donald J. Singer; Arsen Tashjian

## [57] ABSTRACT

A unidirectional heat transfer device for use between an electronic assembly on an aircraft and the skin and/or pod on the aircraft. The device includes a thermal decoupler mechanism which operates to disengage a retractable interface heat transfer surface when the skin on the aircraft reaches a predetermined elevated temperature caused by the high speed of the aircraft. In the decoupled mode, the heat from the electronic equipment passes to a phase change material heat absorber to provide a limited capability cooling function during extended high speed aircraft operation.

2 Claims, 3 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]

**Jorgenson**

[11] **4,273,352**

[45] **Jun. 16, 1981**

[54] **COMBINATION PUSH AND TOW BAR**

[76] **Inventor:** Lyle A. Jorgenson, 7420 S. 1025 E.,  
South Weber, Utah 84403

[21] **Appl. No.:** 58,419

[22] **Filed:** Jul. 18, 1979

[51] **Int. Cl.:** B60D 1/06; B60D 3/00

[52] **U.S. Cl.:** 280/481; 280/491 B;  
293/117

[58] **Field of Search:** 280/491 R, 491 B, 491 D,  
280/491 A, 491 C, 491 E, 481, 498, 499, 492,  
493, 401, 402; 293/117

[56] **References Cited**

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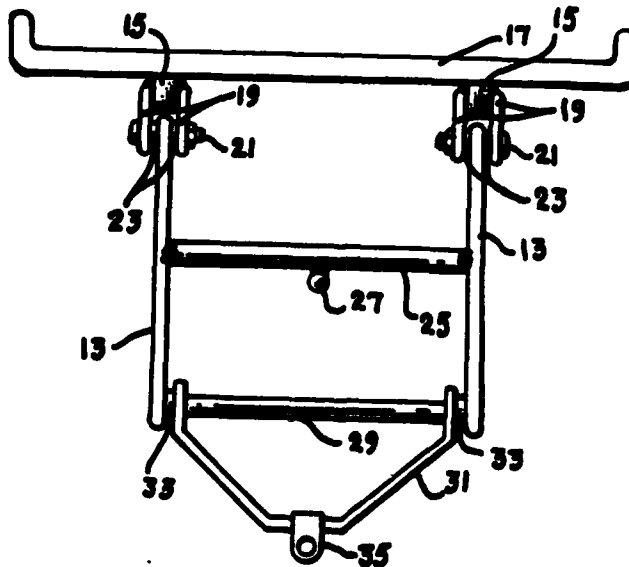
2,378,304	6/1943	Ross	280/491 B
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**Primary Examiner—**John A. Pekar  
**Attorney, Agent, or Firm—**Donald J. Singer; Arsen  
Tashjian

## [57] ABSTRACT

A combination push and tow bar/hitch assembly including a pair of spaced apart parallel outwardly extending mounting bars pivotally attached at their lower ends to the front frame of a motor vehicle. A first transverse brace member is positioned between the mounting bars near the center point and a second transverse brace member is positioned between the outer ends of the mounting bars. A U-shaped frame with a coupler at its apex is pivotally attached to the second transverse brace for use when the bar/hitch is in the horizontal towing position. A ball mounted at the midpoint of the first transverse brace is engaged by the coupler on the U-shaped frame to lock down the frame when the bar/hitch is upward in the push position.

2 Claims, 2 Drawing Figures



## RIGHTS OF THE GOVERNMENT

The invention described herein may be manufactured and used by or for the Government of the United States for all government purposes without the payment of any royalty.

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,273,419**

**Geary**

[45] **Jun. 16, 1981**

**[54] LIGHT-SCATTERING DISC COLLECTOR**

[75] Inventor: **Joseph M. Geary, Edgewood, N. Mex.**

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **132,461**

[22] Filed: **Mar. 21, 1980**

[51] Int. Cl.<sup>3</sup> ..... **G02B 5/02; G01N 21/00**

[52] U.S. Cl. .... **388/328; 356/432; 350/431**

[58] Field of Search ..... **350/17, 188, 87, 314, 350/320; 356/432, 443, 444; 362/355, 259**

**[56] References Cited**

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**Primary Examiner—Jon W. Henry**

**Attorney, Agent, or Firm—Donald J. Singer, Arsen Tashjian**

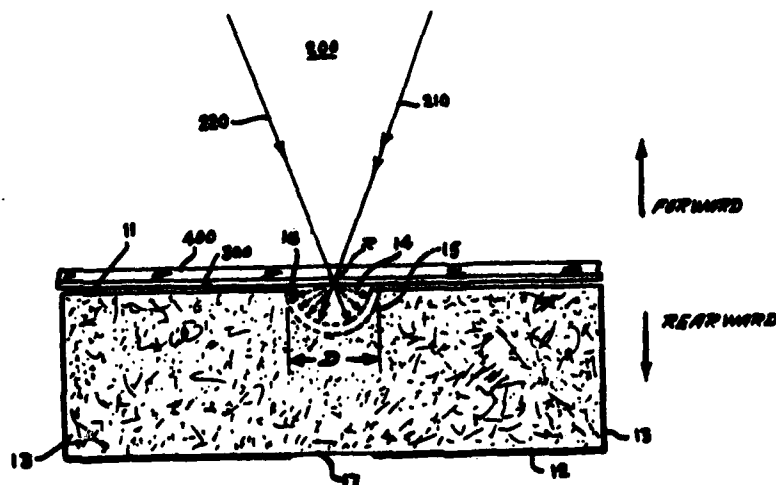
**[57]**

**ABSTRACT**

A light-scattering disc collector member useable in converting a classical (coherence-dependent) microdensitometer to a linear (mode) microdensitometer that is coherence-independent. The member is made of material that is transmissive, non-absorbing, and high scattering as to light, and it preferably comprises a right circular cylinder which is made opaque (such as with black paint), except for a light-transmissive entrance aperture which is located on one base of the cylinder and which is shaped as an inwardly formed hemispherical dome, and a light-transmissive exit aperture which is located on the other base of the cylinder in geometric alignment with the entrance aperture. When used to convert a classical microdensitometer to a linear microdensitometer, the light-scattering disc collector member replaces the objective of the microscope in the sensor optics assembly of the classical microdensitometer.

**8 Claims, 8 Drawing Figures**

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,273,446

Pohle

[45] Jun. 16, 1981

[54] LIGHT SPOT POSITION SENSOR FOR A  
WAVEFRONT SAMPLING SYSTEM

[75] Inventor: Richard H. Pohle, Cupertino, Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 52,163

[22] Filed: Jun. 26, 1979

[51] Int. Cl. G01B 9/02

[52] U.S. Cl. 356/354

[58] Field of Search 356/354

[56] References Cited

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Primary Examiner—John K. Corbin

Assistant Examiner—Scott J. Sugarman

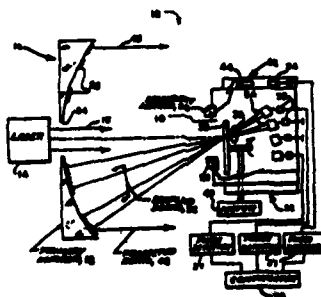
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

[57] ABSTRACT

A light spot position sensor for a wavefront sampling system having a crossed Ronchi chopper disk interposed between the diffracted laser beams of the wavefront sampling system and the intensity detectors located within the wavefront sampler. The crossed Ronchi chopper disk interrupts, at a predetermined interval, the diffracted beam of light which focuses as a spot on the disk. The relative position of the spot(s) is determined with respect to an alignment beam, the position of which is known. By means of appropriate electronics the electronic phase of each frequency of the spot is detected and compared with the phase of each frequency of the known spot to provide a two axis spot position location.

8 Claims, 2 Drawing Figures

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# PATENT ABSTRACT

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United States Patent [19]

Wick

[11] 4,273,536

[45] Jun. 16, 1981

[54] GUN SIMULATOR SYSTEM

[75] Inventor: Ralph E. Wick, Las Vegas, Nev.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 115,844

[22] Filed: Jan. 28, 1980

[51] Int. Cl.: F41F 27/00

[52] U.S. Cl.: 434/14; 434/21

[58] Field of Search: 35/25

[56] References Cited

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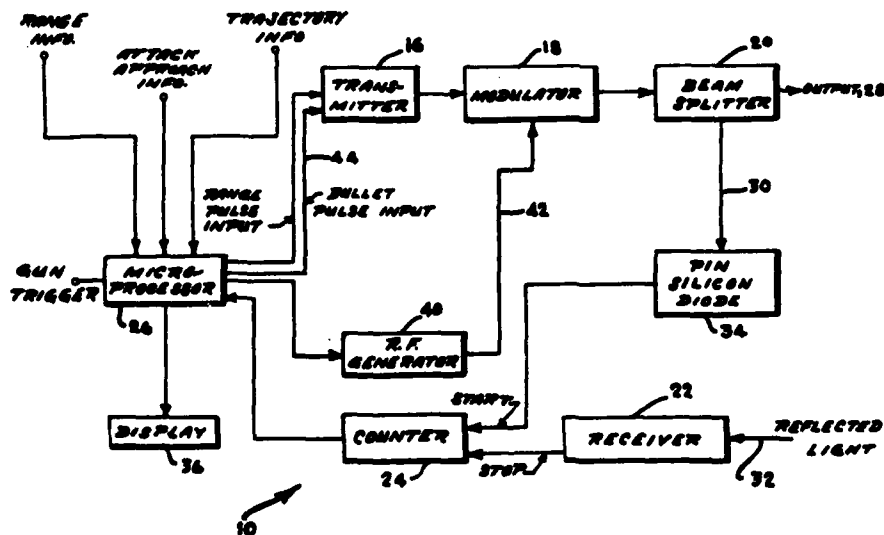
3,955,292	5/1976	Robertson	35/25
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Primary Examiner—William H. Grieb  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

## [57] ABSTRACT

A gun simulator system which is capable of safely simulating any airborne gun. The simulation takes into account not only aircraft approach angle but also preselected range and bullet trajectory. In so doing, the gun simulator system records hits both on the ground and in the aircraft for each pass. In addition, the simulator system is readily adaptable for use with already existing simulator programs.

7 Claims, 3 Drawing Figures



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## United States Patent [19]

Allinikov

[11] 4,273,671

[45] Jun. 16, 1981

### [54] FLUORESCENT DETECTION OF FLAWS

[75] Inventor: Sidney Allinikov, Yellow Springs, Ohio

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 76,631

[22] Filed: Sep. 18, 1979

[51] Int. Cl. G09K 11/06; G01N 19/08

[52] U.S. Cl. 252/301.19; 73/104

[58] Field of Search 252/301.19

### [56] References Cited

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Primary Examiner—F. Edmundson  
Attorney, Agent, or Firm—Donald J. Singer; Cedric H. Kuhn

### [57] ABSTRACT

In a method for detecting flaws in the surface of a work-piece, initially microcapsules containing a fluorescent dye are deposited on the surface. After removal of excess microcapsules from the surface in order to reduce background fluorescence, the surface is visually inspected under ultraviolet light. The method overcomes many of the disadvantages of conventional inspection procedures, e.g., by eliminating use of emulsifiers and by materially shortening processing time.

3 Claims, No Drawings

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United States Patent [19]

[11] 4,273,610

Glass et al.

[45] Jun. 16, 1981

[54] **METHOD FOR CONTROLLING THE  
RESONANCE FREQUENCY OF YTTRIUM  
IRON GARNET FILMS**

[75] Inventors: Howard L. Glass, Orange; Michael T. Elliott, Cypress, both of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 74,263

[22] Filed: Sep. 11, 1979

[51] Int. Cl. .... B32B 9/00

[52] U.S. Cl. .... 156/624; 156/DIG. 63

[58] Field of Search ..... 156/624, DIG. 63, DIG. 73, 156/DIG. 85; 148/171, 1.5

[56] **References Cited**

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Primary Examiner—Hiram Bernstein

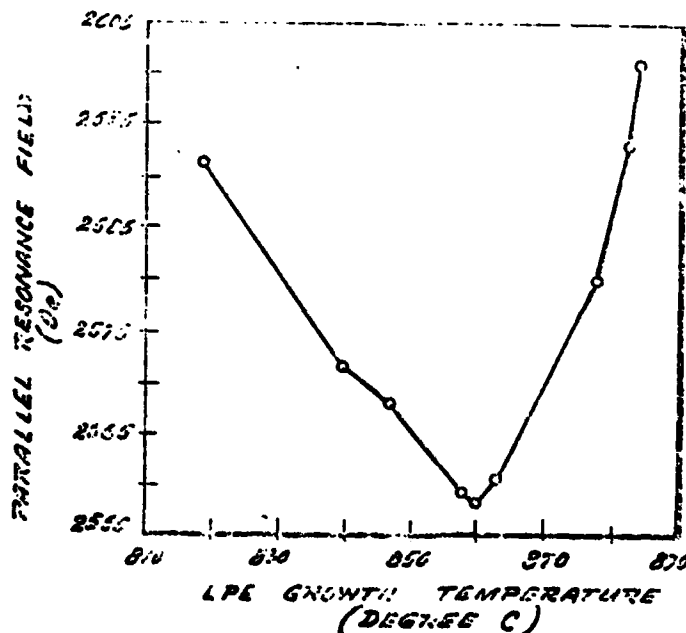
Attorney, Agent, or Firm—Donald J. Singer; William J. O'Brien

[57] **ABSTRACT**

A method for controlling the resonance frequency of single crystal yttrium iron garnet (YIG) films by incorporating lead as a partial substituent for the yttrium component of the YIG film.

1 Claim, 1 Drawing Figure

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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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**United States Patent** [19]

[11] **4,274,049**

**Stoll**

[45] **Jun. 16, 1981**

[54] **INTEGRATED OPTICAL R-F SPECTRUM ANALYZER**

4,056,304 11/1977 Phillips ..... 350/96.14  
4,084,191 4/1978 Lean ..... 350/96.13  
4,095,869 6/1978 Reichelt ..... 350/96.14

[75] **Inventor:** Harold M. Stoll, Palos Verdes Peninsula, Calif.

**Primary Examiner**—Michael J. Tokar  
**Attorney, Agent, or Firm**—Donald J. Singer; Henry S. Miller

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[57] **ABSTRACT**

[21] **Appl. No.:** 70,454

A compact lens-less spectrum analyzer where a laser impinges upon a distributed Bragg deflector via a slab-coupled optical waveguide and is bent 90 degrees. A surface acoustic wave transmitter controlled by an R-F frequency puts out a traveling strain wave which deflects the light beam according to the frequencies present; a manifold of distributed Bragg deflectors receive the deflected signal and are so arranged as to resonate at a particular frequency; the output of the resonating Bragg deflector is detected by a CCD or self-scanning diode array which produces an output indicative of the particular frequency detected.

[22] **Filed:** Aug. 28, 1979

[51] **Int. Cl.:** G01R 23/16

[52] **U.S. Cl.:** 324/77 K; 350/96.13

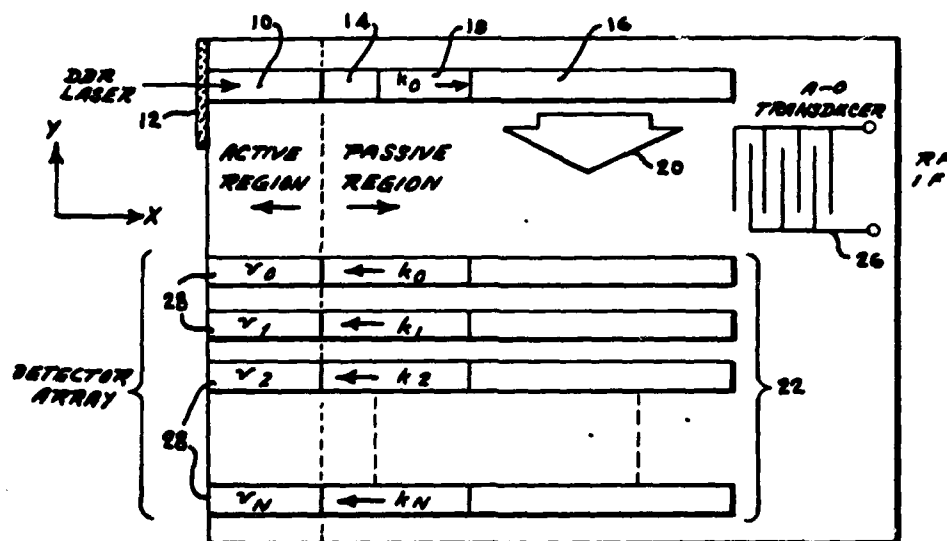
[58] **Field of Search:** 350/96.13, 96.14; 324/77 R, 77 K

[56] **References Cited**

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3,655,261 4/1972 Chang ..... 350/96.13  
3,942,109 3/1976 Cramly ..... 324/77 K  
3,988,671 10/1976 Pedinoff ..... 324/77 K  
4,047,795 9/1977 Hughes ..... 350/96.14

**8 Claims, 2 Drawing Figures**



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United States Patent [19]

[11] 4,274,065

Garscadden et al.

[45] Jun. 16, 1981

[54] CLOSED CYCLE ANNULAR-RETURN GAS  
FLOW ELECTRICAL DISCHARGE LASER

trical Discharge Laser", by Olson; *Rev. Sc. Inst.* vol. 47,  
No. 6, Jun. 76.

[75] Inventors: Alan Garscadden, Yellow Springs;  
Peter Bletzinger, Fairborn; Siegfried  
H. Haasinger; Robert A. Olson, both  
of Kettering; Benjamin Sarka, Enon,  
all of Ohio

*Primary Examiner*—Stanley D. Miller, Jr.  
*Assistant Examiner*—Leon Scott  
*Attorney, Agent, or Firm*—Donald J. Singer; Thomas L.  
Kundert

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

## [57] ABSTRACT

[21] Appl. No.: 62,591

A closed cycle, high repetition pulsed laser having a  
laser flow channel with an annular flow return sur-  
rounding the laser flow channel. Ultra high vacuum  
components and low out-gassing materials are used in  
the device. An externally driven axial flow fan is used  
for gas recirculation. A thyatron-switched low-induc-  
tance energy storage capacitor is used to provide a  
transverse discharge between profiled electrodes in the  
laser cavity.

[22] Filed: Jul. 31, 1979

[51] Int. Cl.<sup>3</sup> ..... H01S 3/03

[52] U.S. Cl. .... 331/94.5 G

[58] Field of Search ..... 331/94.5 G, 94.5 P,  
331/94.5 PE

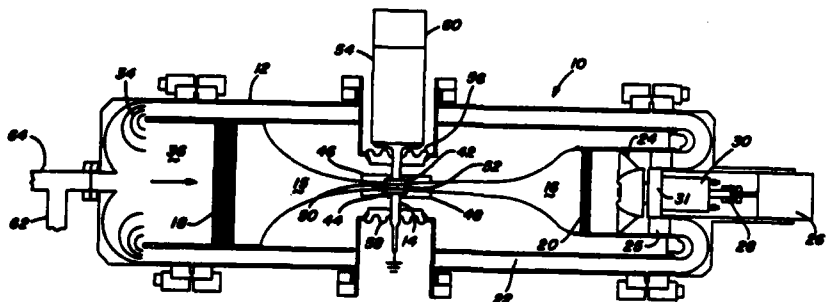
[56] References Cited

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"High-Repetition-Rate Closed-Cycle Rare Gas Elec-

4 Claims, 2 Drawing Figures

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**United States Patent** [19]

[11] **4,274,092**

**Vonusa et al.**

[45] **Jun. 16, 1981**

[54] **DISPLAY SYSTEM FOR MICROSCOPIC  
OPTICAL INSTRUMENTS**

3,885,096 5/1975 Inuiya ..... 340/705  
4,028,712 6/1977 Kawamura et al. .... 340/756  
4,075,619 2/1978 Lapeyre ..... 340/706  
4,149,795 4/1979 Sakurada et al. .... 340/706

[75] **Inventors:** Richard S. Vonusa; Jeffrey P.  
Woodard, both of Rome, N.Y.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

*Primary Examiner*—Marshall M. Curtis  
*Attorney, Agent, or Firm*—Donald J. Singer; Jacob N.  
Erlich

[21] **Appl. No.:** 91,991

[22] **Filed:** Nov. 7, 1979

[51] **Int. Cl.:** ..... G06F 3/14

[52] **U.S. Cl.:** ..... 340/705; 340/706;  
340/782

[58] **Field of Search** ..... 340/705, 706, 756, 762,  
340/782; 354/23 D, 53, 54, 55, 60 E, 60 L

[56] **References Cited**

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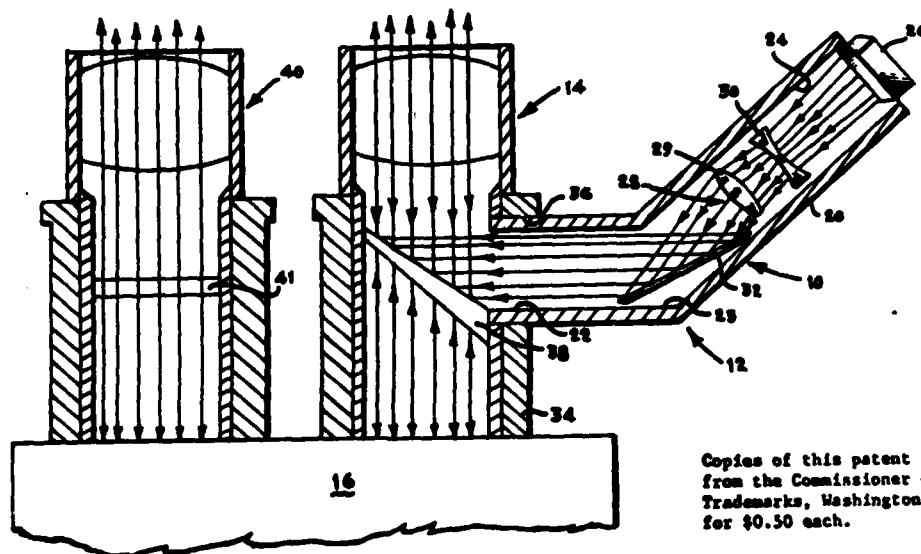
3,289,176 11/1966 Garth, Jr. et al. .... 340/711  
3,364,473 1/1968 Reitz et al. .... 340/711  
3,382,487 5/1968 Sharon et al. .... 340/744  
3,866,199 2/1975 Eberhard et al. .... 340/705

## [57] ABSTRACT

A display system for use with a microscopic optical instrument having at least one eyepiece. The display system has a display unit operably attached to the eyepiece and incorporates therein a LED display which provides direct visual feedback to an individual who views imagery through the optical instrument. The LED display is interfaced to a computer which provides intelligent control of the display system when activated by the operator of the optical instrument. When not activated, the display system allows normal viewing through the optical instrument to take place.

8 Claims, 3 Drawing Figures

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United States Patent [19]

[11] 4,274,098

Renau et al.

[45] Jun. 16, 1981

## [54] LOSS-FREE SCANNING ANTENNA

[75] Inventors: Jacques Renau, Culver City; James W. Cartis, Riverside; Donald S. Nicholson; Frank L. Hennessey, both of Los Angeles, all of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 128,343

[22] Filed: Mar. 7, 1980

[51] Int. Cl.<sup>3</sup> ..... H01Q 19/19

[52] U.S. Cl. .... 343/781 CA; 343/839; 343/840

[58] Field of Search ..... 343/761, 781 P, 781 CA, 343/839, 840

## [56] References Cited

### U.S. PATENT DOCUMENTS

2,976,533	3/1961	Salisbury	343/755
3,641,577	2/1972	Tocquec	343/754
4,044,361	8/1977	Yokoi et al.	343/754
4,062,018	12/1977	Yokoi et al.	343/761

Primary Examiner—Eli Lieberman

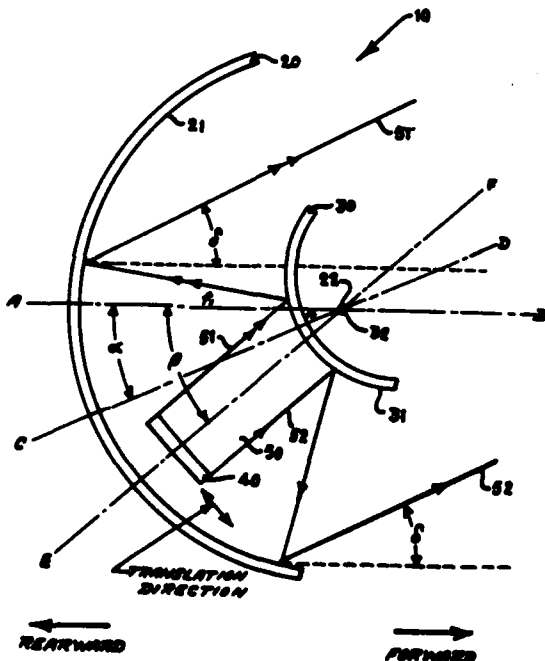
Attorney, Agent, or Firm—Donald J. Singer; Arsen Tashjian

## [57] ABSTRACT

A system for, and a method of, scanning a collimated beam of electromagnetic radiation with a very large primary reflector of an antenna system without loss (i.e., with zero phase error) and without moving the primary reflector. The system is a two dimensional scan, loss-free, Cassegrain antenna system which comprises a stationary, parabolic-shaped, primary reflector, and a smaller, movable, parabolic-shaped subreflector, and also a movable, plane wave, electromagnetic radiation beam source interposed between the two reflectors. It is shown that, without moving the primary reflector, the beam can be scanned over wide angles with no phase error in the plane of scan, provided that the source and the subreflector are rotated about the focal point of the antenna in a specific manner. A unique angular relationship between the source and the subreflector is required for each scan angle, and is taught. The method includes the step of using this antenna system in scanning the beam from the primary reflector, without any phase error and without moving the primary reflector.

3 Claims, 1 Drawing Figure

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United States Patent [19]

[11] 4,275,263

Chino

[45] Jun. 23, 1981

[54] **ELECTRICALLY INSULATING  
STRUCTURALLY STRONG BUSHING  
ASSEMBLY**

2,216,564 10/1940 Chapman ..... 174/151 X  
3,086,072 4/1963 Forman ..... 174/138 D  
3,413,591 11/1968 Hergenhan ..... 174/153 R X

[75] Inventor: John J. Chino, Arnold, Md.

## FOREIGN PATENT DOCUMENTS

574115 12/1945 United Kingdom ..... 308/237 R

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

Primary Examiner—Laramie E. Askin  
Attorney, Agent, or Firm—Donald J. Singer; Arsen  
Tashjian

[21] Appl. No.: 63,510

## ABSTRACT

[22] Filed: Aug. 3, 1979

[51] Int. Cl. .... H01B 17/26

[52] U.S. Cl. .... 174/152 R; 174/138 D;  
308/237 R

[58] Field of Search ..... 174/138 R, 138 D, 151,  
174/152 R, 152 G, 153 R; 24/73 S; 16/2; 85/1  
C; 308/4 R, 36, 237 R, 237 A, 238, 239;  
339/130 R, 130 C; 361/390, 391, 399, 415

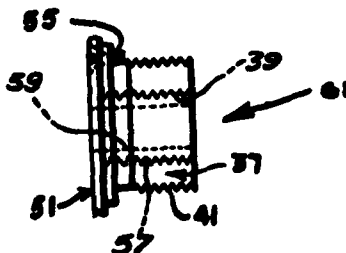
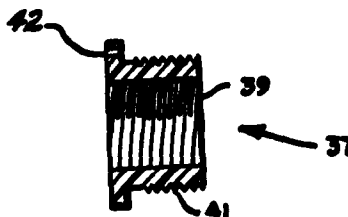
An electrically insulating, structurally strong bushing assembly for use at the chassis mounting interface of an electronic chassis, especially a Low Power RF chassis requiring a single point electrical ground, includes a specially machined epoxy-glass bushing for electrical insulation with a steel insert for high strength. The epoxy-glass bushing is machined from plate stock with the grain direction running perpendicular to the structural load and includes both inside and outside threads. The steel insert threads into the epoxy-glass bushing which is then threaded into the electronic chassis.

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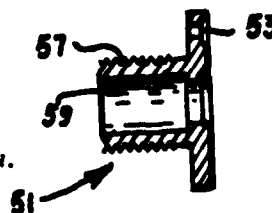
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1,655,892 1/1928 Colburn ..... 174/138 D  
1,956,869 5/1934 Lipman ..... 174/152 R

1 Claim, 14 Drawing Figures

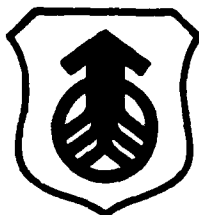


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United States Patent [19]

[11] 4,275,857

Bergsten

[45] Jun. 30, 1981

- [54] COOLING SYSTEM FOR RAMJET ENGINE  
[75] Inventor: M. Brian Bergsten, Centerville, Ohio  
[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 91,228

[22] Filed: Nov. 5, 1979

[51] Int. Cl.<sup>3</sup> ..... B64D 33/02

[52] U.S. Cl. .... 244/53 B; 60/39.18 C;  
60/266; 60/728; 62/5; 62/239; 62/241;  
137/15.1; 244/117 A

[58] Field of Search ..... 60/266, 728, 39.18 C;  
244/53 B, 117 A; 137/15.1; 62/5, 239, 241

[56] References Cited

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2,644,315	7/1953	Jamieson	62/5
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2,786,341	3/1957	Green	62/5
2,839,900	6/1958	Green	62/5
2,839,901	6/1958	Green	62/5

2,858,698	11/1958	Hickey	62/5
2,873,582	2/1959	Green	62/5
2,893,204	7/1959	Anderson et al.	60/39.18 C
3,090,208	5/1963	Munakata	62/5
3,361,336	1/1968	Foa	62/5
3,461,676	8/1969	Toelke et al.	62/5
3,703,146	11/1972	Kovats	60/39.18 C
3,973,396	8/1976	Kronogard	60/39.09 D

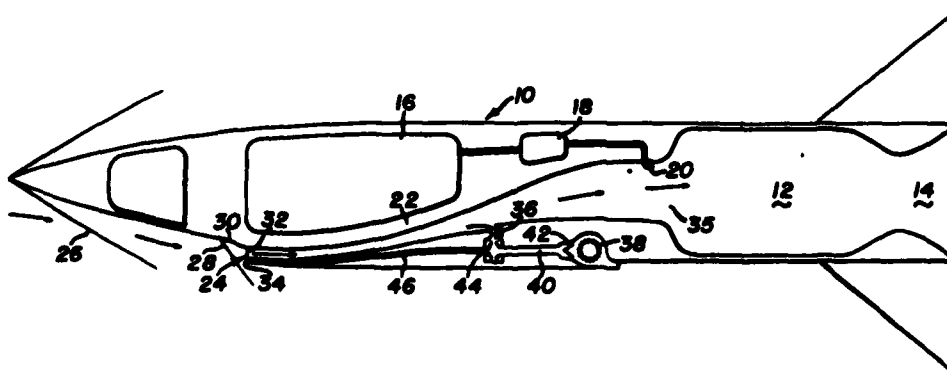
Primary Examiner—Ronald C. Capossela  
Attorney, Agent, or Firm—Donald J. Singer; Richard J. Killoren

[57]

## ABSTRACT

A ramjet powered vehicle having a bleed slot in the subsonic diffuser, for the ramjet combustor, which supplies air to a turbine for supplying power to vehicle accessories. A vortex tube is provided between the bleed slot and the turbine to provide a cool air supply. Radar absorbing material is positioned adjacent ramjet inlet with a cooling duct provided to supply cooling air from the vortex tube to the ramjet inlet cowl lip to provide cooling for the radar absorbing material.

2 Claims, 4 Drawing Figures



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United States Patent [19]

[11] 4,275,859

Bloday

[45] Jun. 30, 1981

[54] OPTICAL DOME PROTECTION DEVICE

[75] Inventor: Michael P. Bloday, Concord, Mass.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 184,923

[22] Filed: Dec. 18, 1979

[51] Int. Cl. .... B64C 1/10

[52] U.S. Cl. .... 244/121; 343/872

[58] Field of Search ..... 244/121, 1 R, 1 A, 53 B, 244/53 R; 343/872

[56] References Cited

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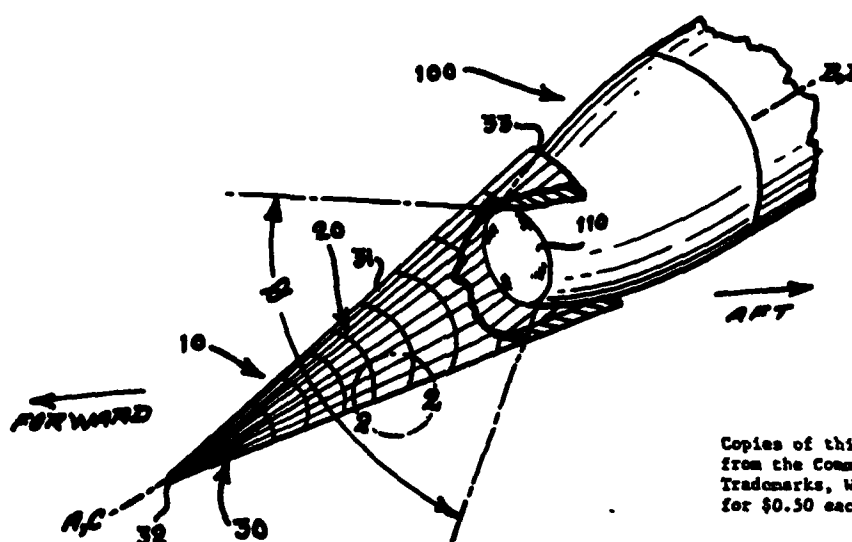
2214873 10/1973 Fed. Rep. of Germany ..... 244/52 B

Primary Examiner—Robert B. Reeves  
Assistant Examiner—Gene A. Church  
Attorney, Agent, or Firm—Donald J. Singer; Arsen Tashjian

[57] ABSTRACT

A conical shaped, screen-like structured device that is positioned over, and forward of, the rain-erodible, thermal shock-susceptible optical dome of an optically guided missile which travels at varying speeds, from sub-sonic to and including supersonic, through an air environment in which raindrops are falling. This device provides raindrop erosion protection to the dome by fragmenting the raindrops before they impact on the dome; and, it also provides thermal shock protection to the dome by producing a region of relatively stagnant air forward of the dome, and within the device, which reduces the heating rate to the dome. The device allows the use of lower cost rain-erodible and thermal shock-susceptible materials for the optical dome.

10 Claims, 3 Drawing Figures



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R&D RECORD (Patent Abstract)

JAT 00327

AFSC — Andrews AFB Md 1976



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,278,519

Won

[45] Jul. 14, 1981

[54] **ELECTRODE ASSEMBLY FOR  
DETERMINING THE IDENTIFICATION OF  
METALS AND METAL ALLOYS**

[76] Inventor: Vann Y. Won, 6697 Gloria Dr.,  
Sacramento, Calif. 95831

[21] Appl. No.: 115,515

[22] Filed: Jan. 25, 1980

[51] Int. Cl.: G01N 27/32

[52] U.S. Cl.: 204/195 F; 204/195 R;  
324/71 R

[58] Field of Search: 204/195 F, 195 R;  
324/71 R

[56] **References Cited**

## U.S. PATENT DOCUMENTS

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2,665,412	1/1954	Eding et al.	324/71 R
2,684,938	7/1954	Mantzell	204/195 R
3,034,050	5/1962	Yuen	324/71 R
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Primary Examiner—G. L. Kaplan

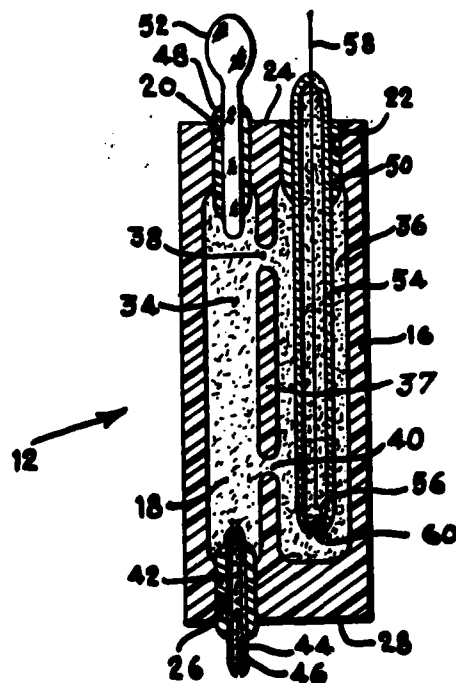
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

[57]

## ABSTRACT

An improved electrode assembly for determining the identification of metals and metal alloys having a test probe and a memory voltage indicator circuit for registering the potential difference (voltage) between the test probe and the metal to be identified. The test probe is made of a durable body having a pair of chambers therein for containing a saturated water solution of potassium chloride. A thin-walled tube is located within one of the chambers and contains therein a conductive wire and a saturated liquid mercury solution of granular calomel and potassium chloride. The voltage indicator circuit is electrically connected between the conductive wire and the metal to be identified. Utilizing the two chamber construction of the test probe substantially eliminates gas lock within the test probe and thereby allows extremely reliable and accurate readings of potential difference between the test probe and metal. These voltage readings are an indication of the characteristic properties of the metal to be identified.

3 Claims, 2 Drawing Figures



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**P**ATENT  
**A**BSTRACT

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**United States Patent** [19]

**Elwell, Jr.**

[11] **4,278,557**

[45] **Jul. 14, 1981**

[54] **SOLVENT MIXTURE FOR DISSOLVING  
AND REMOVING EPOXY RESINOUS  
COMPOUNDS**

[75] **Inventor:** John L. Elwell, Jr., Hooper, Utah

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 140,640

[22] **Filed:** Apr. 15, 1980

[51] **Int. Cl.:** C11D 7/52

[52] **U.S. Cl.:** 252/171; 252/162;  
252/170; 252/172; 252/DIG. 8; 252/DIG. 9;  
252/DIG. 10; 252/364; 134/38; 134/39;  
134/40; 15/104.05; 106/311

[58] **Field of Search** ..... 252/171, 172, 170, 162,  
252/DIG. 8, DIG. 9, DIG. 10, 364; 134/38, 39,  
40; 15/104.05; 106/311

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

3,147,224 9/1964 Gauntt et al. .... 252/171 X  
3,625,763 12/1971 Melillo ..... 252/171 X

**Primary Examiner**—Mayer Weinblatt  
**Attorney, Agent, or Firm**—Donald J. Singer; William J.  
O'Brien

[57] **ABSTRACT**

A solvent solution for dissolving and removing epoxy  
resinous formulations. The solution is composed of a  
mixture of methanol, dichloromethane and distilled  
water as essential components.

**2 Claims, No Drawings**

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United States Patent [19]

[11] 4,278,950

Ahouse et al.

[45] Jul. 14, 1981

[54] ELECTRO-DYNAMIC LASER WITH  
ACOUSTIC ABSORBING ELECTRODE

4,196,399 4/1980 Cason et al. 331/94.5 G

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[75] Inventors: David R. Ahouse, Andover; Jack D. Dougherty, Winchester; Sheldon L. Glickler, Framingham; Paul F. Kellen, Medford; George W. Setton; David Korff, both of Lexington; Marvel J. Yoder, Andover, all of Mass.

"Output Flux Instabilities in a Flowing-Gas cw CO<sub>2</sub> Electric Discharge Laser", Yoder et al., *App. Phys. Lett.*, vol. 27, No. 12, pp. 673-676, Dec. 15, 1975.

"Beam Properties of a CO<sub>2</sub> Continuous-Wave Electric Discharge Laser," *Optical Engineering*, vol. 18, No. 3, pp. 340-344, (May-Jun. 1979); Kellen et al.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Primary Examiner—William L. Sikes  
Assistant Examiner—Leon Scott, Jr.  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

[21] Appl. No.: 46,073

[22] Filed: Jun. 6, 1979

[51] Int. Cl. H01S 3/08; H01S 3/22

[52] U.S. Cl. 331/94.5 G; 331/94.5 C

[58] Field of Search 331/94.5 PE, 94.5 T, 331/94.5 G

[56] References Cited

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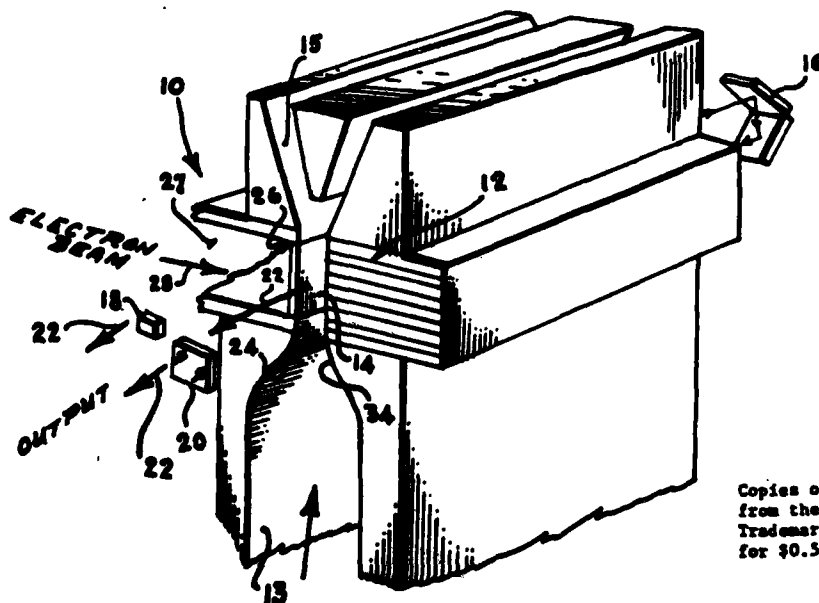
3,702,973 11/1972 Dougherty et al. 331/94.5 PE  
3,848,202 11/1974 Hyne 331/94.5 PE  
3,952,264 4/1976 Ingard 331/94.5 G

## ABSTRACT

A high pressure, high power, continuous wave electrodynamic laser having one of the electrodes (preferably the cathode) made of a porous conductive surface and a backing material capable of broad band acoustic absorption. Such an arrangement effectively absorbs acoustic disturbances which arises primarily from a linear instability within the resonant cavity of the electrodynamic laser and thereby substantially reduces output flux modulations within the resonant cavity.

10 Claims, 2 Drawing Figures

Requests for licensing information should be addressed to:  
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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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**United States Patent** [19]

[11] **4,278,953**

**Chiao et al.**

[43] **Jul. 14, 1981**

[54] **NEAR MILLIMETER WAVELENGTH  
MODULATOR AND TUNABLE  
OSCILLATOR**

[75] **Inventors:** Raymond Y. Chiao, Berkeley, Calif.;  
Harold R. Fetterman, Lexington,  
Mass.; Howard R. Schlomberg,  
Annandale, Va.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 23,371

[22] **Filed:** Mar. 23, 1979

[51] **Int. Cl.:** H01S 3/10

[52] **U.S. Cl.:** 332/7.51; 331/94.5 C;  
331/94.5 D; 307/428

[58] **Field of Search:** 332/7.51; 331/94.5 C,  
331/94.5 D; 307/425, 428

[56] **References Cited**

## U.S. PATENT DOCUMENTS

3,662,183	5/1972	Ashkin et al.	307/428
3,675,039	7/1972	Boyd et al.	307/428
3,789,235	1/1974	Bridges et al.	307/425
4,083,335	4/1978	Guilino	307/425
4,131,792	12/1978	Schlomberg	356/349

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pp. 151-154, App. Phys. Letters, vol. 33, #2, G-254.  
Far et al., "Thin-Film VO<sub>2</sub> . . . Polarizers", 7/1/77, pp.  
11-13, App. Phys. Letters, vol. 31, #1, G-254.

**Primary Examiner**—Nelson Moskowitz  
**Attorney, Agent, or Firm**—Donald J. Singer; Jacob N.  
Erich

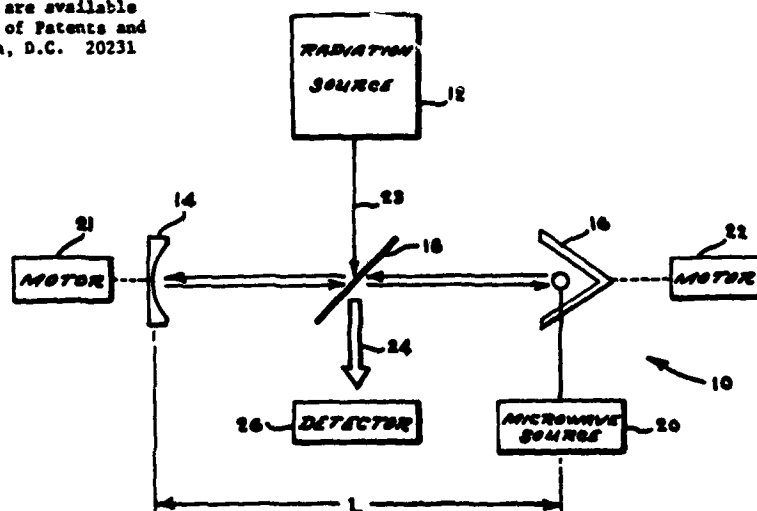
## [57] ABSTRACT

A modulator and tunable oscillator capable of reliable operation in the near millimeter wavelength region. The modulator is made up of a pair of reflectors and a beamsplitter interposed therebetween with one of the reflectors having variable reflectivity. In addition, the reflectors are spaced apart a preselected distance such that a resonant condition is achieved with respect to an incoming beam of near millimeter wavelength radiation. By applying a signal to the variable reflector a beam of radiant energy is generated at a wavelength at which a non-resonant condition is achieved between the reflectors. This generated beam of radiation is directed out of the modulator by the beamsplitter. The oscillator utilizes the same elements as the modulator and in addition incorporates therein an additional beam splitter and a detector as well as a feedback circuit between the detector and variable reflector.

10 Claims, 2 Drawing Figures

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,278,955

Lunden

[45] Jul. 14, 1981

[54] COUPLER FOR FEEDING EXTENSIBLE TRANSMISSION LINE

[75] Inventor: Clarence D. Lunden, Federal Way, Wash.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 123,612

[22] Filed: Feb. 22, 1980

[51] Int. Cl.<sup>3</sup> ..... H01P 5/08

[52] U.S. Cl. .... 333/33; 333/238; 333/240

[58] Field of Search ..... 333/24, 222, 236, 238, 333/240, 246, 260, 33

[56] References Cited

## U.S. PATENT DOCUMENTS

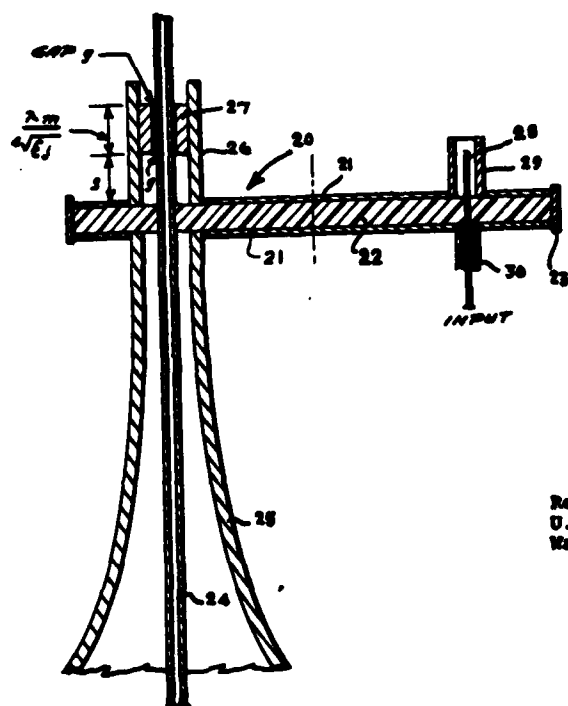
3,639,857	2/1972	Okoshi et al.	333/238 X
3,882,418	5/1975	Godard et al.	333/236 X
4,193,047	3/1980	Carter et al.	333/222 X

Primary Examiner—Paul L. Gensler  
Attorney, Agent, or Firm—Donald J. Singer; Willard R. Matthews, Jr.

## [57] ABSTRACT

An extensible surface wave transmission line is fed through a coupler that utilizes the geometric properties of a planar ellipse. The coupler is in the form of a planar elliptical r.f. cavity with the r.f. input signal being fed to the cavity at the location of one ellipse focus point and the extensible output transmission line slidably traversing the cavity at the position of the other ellipse focus point. The elliptical eccentricity of the r.f. cavity is chosen such that the direct path between the ellipse foci is one half wavelength less than the ellipse major axis (or any indirect path-length between foci) thereby ensuring constructive addition of all input signals at the coupler output. The coupler is adapted to use in conjunction with aircraft antennas, transit and rail system applications, and electrical cable manufacturing quality control systems.

8 Claims, 11 Drawing Figures



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**United States Patent** [19]

[11] **4,279,070**

**Chao et al.**

[45] **Jul. 21, 1981**

**[54] METHOD OF MAKING INTEGRATED  
WAVEGUIDE CAVITIES**

[75] **Inventors:** Chente Chao, Minnetonka, Minn.;  
Edward M. Nakaji; Robert L.  
Bernick, both of Torrance, Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 127,817

[22] **Filed:** Mar. 4, 1980

[51] **Int. Cl.:** H01P 11/00

[52] **U.S. Cl.:** 29/583; 29/601;  
29/589; 29/591

[58] **Field of Search:** 29/576 J, 583, 600,  
29/601, 589, 577 R, 591

**[56] References Cited**

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3,916,510	11/1975	Martin	29/583
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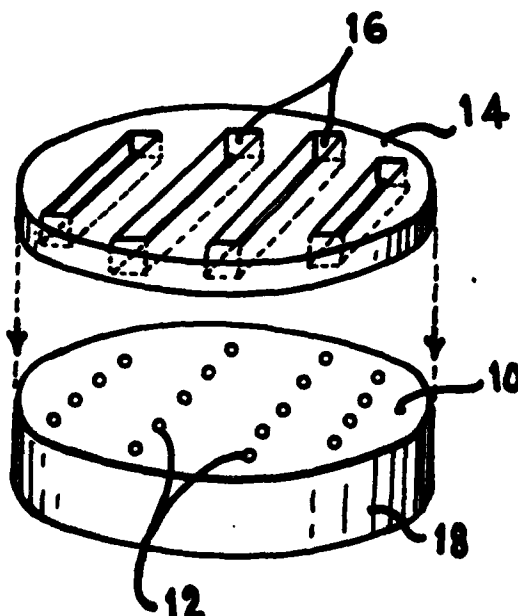
**Primary Examiner**—Aaron Weisstuch  
**Attorney, Agent, or Firm**—Donald J. Singer; Henry S.  
Miller

**[57] ABSTRACT**

This invention provides a method for forming a waveguide cavity as a step in the process of diode fabrication. Semiconductor diodes are formed in a conventional manner. A plate of waveguide material having a thickness equivalent to waveguide height and slots corresponding to waveguide width is bonded to a semiconductor wafer containing a number of diodes. The slots are formed to correspond to rows of diodes, so that when bonded the diodes are centered in the slot. The package may then be divided as needed and the sides and thickness of the slot form the waveguide.

**6 Claims, 3 Drawing Figures**

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,279,236

Dallman

[45] Jul. 21, 1981

[54] AUTOMOTIVE FUEL SAVING SYSTEM

[76] Inventor: Alfred C. Dallman, 2437 Bending  
Willow Dr., Kettering, Ohio 45440

[21] Appl. No.: 83,904

[22] Filed: Oct. 11, 1979

[51] Int. Cl.<sup>3</sup> ..... F02M 25/06

[52] U.S. Cl. .... 123/573; 123/572;  
123/585

[58] Field of Search ..... 123/572, 573, 41.86,  
123/585, 556

[56] References Cited

U.S. PATENT DOCUMENTS

3,358,661	12/1967	Garner	123/573
3,990,421	11/1976	Grainger	123/572
4,103,655	8/1978	Coles	123/572

Primary Examiner—Ronald H. Lazarus  
Attorney, Agent, or Firm—Donald J. Singer; Robert  
Kern Duncan

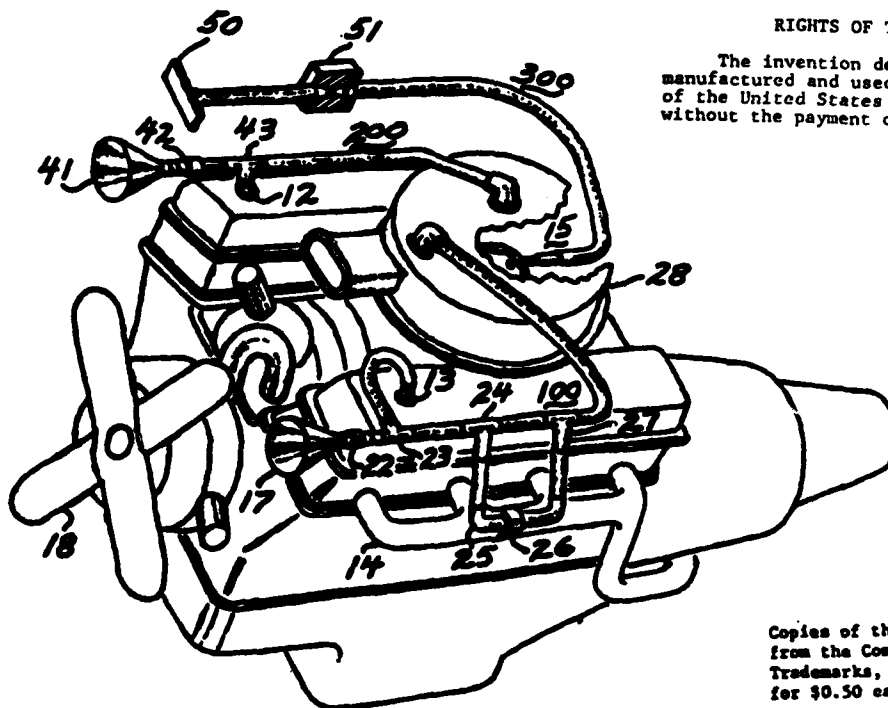
[57] ABSTRACT

In a first air flow circuit filtered ram air cooperating with an aspirator draws crankcase vapors from the crankcase of an internal combustion engine. Heavy particulate matter in the crankcase vapor is heated and further vaporized by a heat exchanger cooperating with an exhaust manifold of the engine. A second aspirator draws the vaporized particulate matter back into the original vapor stream of the first air flow circuit. The crankcase vapors mixed with the incoming ram air are then directed into the interior cavity of the carburetor air filter. In a second air flow circuit filtered ram air is directed into the crankcase and carburetor air filter cavity and in a third air flow circuit filtered air is drawn through a variable annular orifice and metered in accord with intake manifold pressure and directed into the engine air intake system below the carburetor throttle plate.

8 Claims, 8 Drawing Figures

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# PATENT ABSTRACT

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United States Patent [19]

[11]

4,279,382

Wilson, Jr.

[45]

Jul. 21, 1981

[54] RADIAL AND AXIAL FLOW VARIABLE  
EXHAUST NOZZLE FOR A GAS TURBINE  
ENGINE

3,409,250 11/1968 Ammer et al. .... 244/52  
3,441,219 4/1969 Turner ..... 239/265.33 X  
3,685,293 8/1972 Shipman ..... 239/265.25 X  
3,982,696 9/1976 Gordon ..... 239/265.17

[75] Inventor: Paul Wilson, Jr., Lake Park, Fla.

Primary Examiner—Robert B. Reeves

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

Assistant Examiner—Gene A. Church

Attorney, Agent, or Firm—Donald J. Singer; Jacob N.  
Erllich

[21] Appl. No.: 115,847

[57]

ABSTRACT

[22] Filed: Jan. 28, 1980

[51] Int. Cl. .... B05B 17/04

[52] U.S. Cl. .... 239/11; 239/265.25

[58] Field of Search .... 239/265.25, 265.33,  
239/265.19, 265.11, 265.17, 1; 244/52, 23 R,  
23 C; 60/228, 229, 230, 231

Minimum thrust at idle speed, and maximum thrust with  
minimum losses at speeds above idle, are provided in a  
gas turbine engine by the use of a plurality of adjacent,  
successively overlapping, annularly disposed, pivot-  
able, exhaust nozzle-forming fairings which are opened  
during idle to direct the exhaust gases overboard in  
radial directions between the opened fairings, and  
which are closed during speeds above idle to direct the  
exhaust gases overboard in an axial direction through an  
axially aligned rearwardly located exit opening of the  
exhaust nozzle.

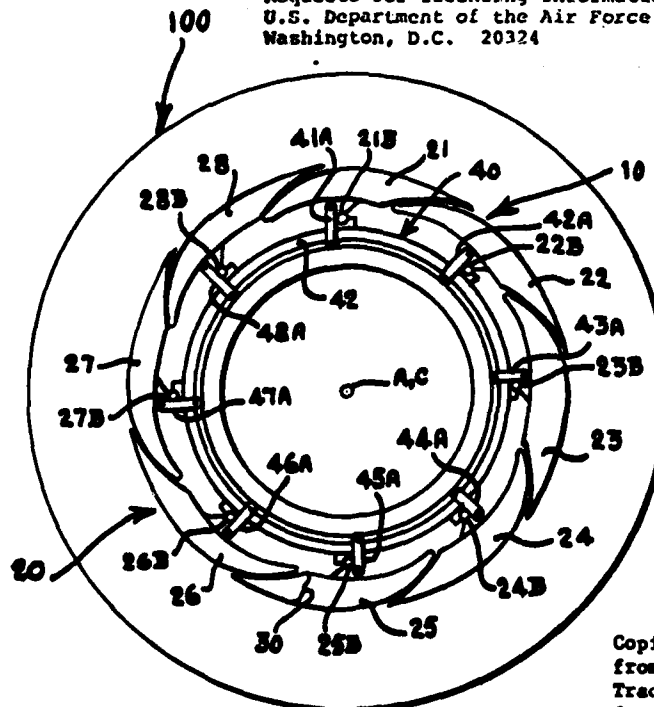
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1 Claim, 4 Drawing Figures

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JAT 00335



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,280,135

Schlossberg

[45] Jul. 21, 1981

## [54] REMOTE POINTING SYSTEM

[76] Inventor: Howard R. Schlossberg, 4811  
Hercules Ct., Annandale, Va. 22003

[21] Appl. No.: 44,813

[22] Filed: Jun. 1, 1979

[51] Int. Cl.<sup>3</sup> ..... H04N 7/18

[52] U.S. Cl. .... 358/93; 178/18

[58] Field of Search ..... 358/93, 183, 107;  
340/707, 708, 716, 721, 734; 178/18, 19; 35/25

## [56] References Cited

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4,150,285	4/1979	Brienza et al.	358/107

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9 Claims, 3 Drawing Figures

Primary Examiner—Joseph A. Orsino, Jr.  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

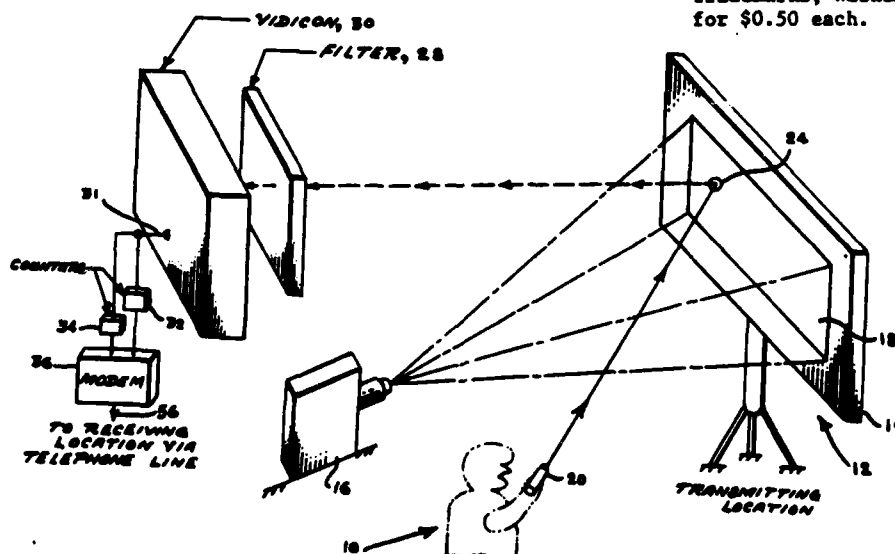
## [57] ABSTRACT

A remote pointing system which permits the remote positioning of a laser beam in accordance with signals received from a laser beam situated at another location. These signals are derived through the use of an appropriate filter, television camera, pair of counters and modem located at the transmitting location and a telephone receiver, modem, microcomputer, pair of analog to digital converters and suitable beam directing means at the remote or receiving location. By interconnecting the above-mentioned elements by way of a telephone line and proper interfacing of electronics, positioning of the remote laser beam can be accurately and reliably accomplished.

## RIGHTS OF THE GOVERNMENT

The invention described herein may be manufactured and used by or for the Government of the United States for all government purposes without the payment of any royalty.

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**United States Patent** [19]

[11]

**4,281,185**

**Paciorek et al.**

[45]

**Jul. 28, 1981**

[54] **SYMMETRICAL  
DIPHOSPHATETETRAAZACYCLOOCTATETRA-  
ENES**

[75] **Inventors:** Kazimiera J. L. Paciorek, Corona  
Del Mar; Reinhold H. Kratzner,  
Irvine; Thomas I. Ito, Fountain  
Valley; James H. Nakahara, Irvine,  
all of Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 163,134

[22] **Filed:** Jan. 26, 1980

[51] **Int. Cl.:** C07F 9/22; C10M 1/44

[52] **U.S. Cl.:** 564/13; 252/49.9;  
252/389 A; 252/400 A

[58] **Field of Search:** 564/13; 252/49.9, 389 A,  
252/400 A

[56]

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3,846,374	11/1974	Farley et al.	564/13
4,166,071	8/1979	Paciorek et al.	564/13
4,215,072	7/1980	Paciorek et al.	252/49.9 X

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Zhur. Obshch. Khim., vol. 32, No. 9, (1962).

*Primary Examiner*—Thomas A. Waltz

*Attorney, Agent, or Firm*—Donald J. Singer; William J.  
O'Brien

[57]

## ABSTRACT

A method for synthesizing symmetrical diphosphatet-  
raazacyclooctatetraenes and the products produced  
thereby. The synthesis involves effecting a reaction  
between a diaryltrihalophosphorane of a perfluoroalkyl  
amidine in the presence of an acid acceptor.

**8 Claims, No Drawings**

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,281,582

Jaqua

[45] Aug. 4, 1981

- [54] CONTROL PISTON FOR LIQUID  
PROPELLANT GUN INJECTOR
- [75] Inventor: Vance W. Jaqua, Canoga Park, Calif.
- [73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

4,050,348 9/1977 Graham ..... 89/7  
4,099,445 7/1978 Singelmann et al. .... 89/7  
4,100,836 7/1978 Hofmann ..... 89/7  
4,126,078 11/1978 Ashley ..... 89/7  
4,160,405 7/1979 Ayler et al. .... 89/7

Primary Examiner—David H. Brown  
Attorney, Agent, or Firm—Donald J. Singer; Robert  
Kern Duncan

[21] Appl. No.: 50,274

[22] Filed: Jun. 19, 1979

[51] Int. Cl.<sup>3</sup> ..... F41F 1/04

[52] U.S. Cl. .... 89/7

[58] Field of Search ..... 89/7, 11, 1 R

[56] References Cited

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3,138,990 6/1964 Jukes et al. .... 89/7  
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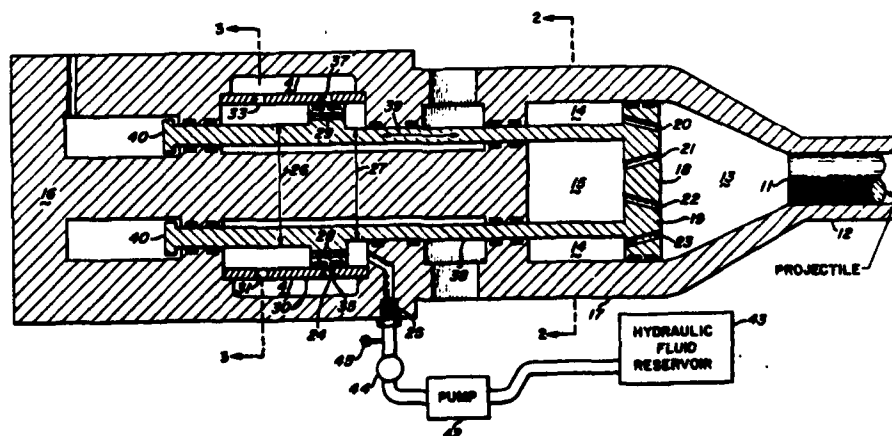
## [57] ABSTRACT

The injection piston of a regenerative liquid propellant gun is attached to a second piston that has a programmed hydraulic resistance which controls its motion, thus the propellant injection rate from the injection piston and the burning rate of the injected propellants is controlled to provide better propellant pressure-time burning characteristics.

1 Claim, 3 Drawing Figures

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AFSC — Andrews AFB Md 1978



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## United States Patent [19]

[11] 4,283,687

Madey et al.

[45] Aug. 11, 1981

### [54] FREE ELECTRON LASER WITH END TAPERED WIGGLER STRENGTH

3,822,410 7/1974 Madey ..... 331/94.5 PE

[75] Inventors: John M. J. Madey, Palo Alto; Luis R. Elias, Mountain View; Todd I. Smith, Palo Alto, all of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 61,557

[22] Filed: Jul. 27, 1979

[51] Int. Cl.<sup>3</sup> ..... H01S 3/09; H01S 3/14

[52] U.S. Cl. .... 331/94.5 PE; 330/4.3

[58] Field of Search ..... 331/94.5 PE, 94.5 P; 335/213, 210; 315/3, 4, 5; 330/4.3

### [56] References Cited

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Primary Examiner—William D. Larkins  
Attorney, Agent, or Firm—Donald J. Singer; Willard R. Matthews

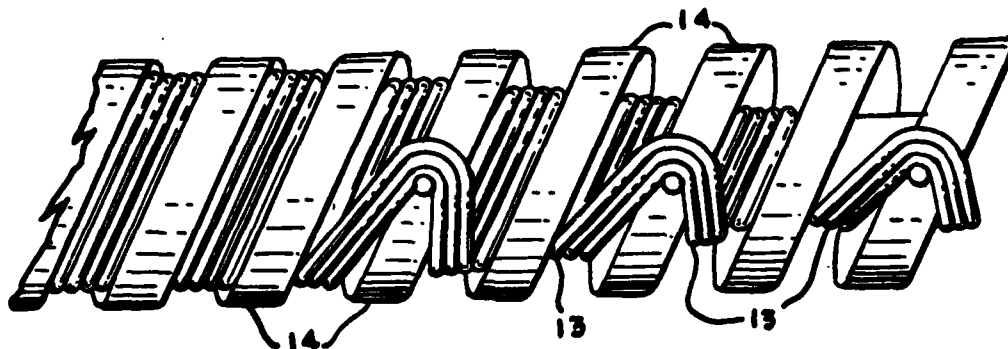
### [57] ABSTRACT

Improved gain and the elimination of beam insertion and extraction compensation in free electron lasers is realized by means of a helical periodic magnet. The magnet comprises one or more layers of coaxial bifilar helical conductors each being 180° displaced and conducting current in opposite directions. The end portions of the magnet are tapered by extending successive layers one or more turns to provide a field gradient that uniformly decreases to zero.

1 Claim, 6 Drawing Figures

Requests for licensing information should be addressed to:  
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JAT 00339





# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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## United States Patent [19]

Tracy

[11] 4,283,755

[45] Aug. 11, 1981

### [54] MODULATOR MULTILAYER DETECTOR

[75] Inventor: John M. Tracy, Thousand Oaks, Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 118,384

[22] Filed: Feb. 5, 1980

[51] Int. Cl.<sup>3</sup> ..... H05K 1/14

[52] U.S. Cl. .... 361/393; 361/495; 361/413; 361/414

[58] Field of Search ..... 361/393, 395, 396, 414, 361/413

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,185,898 5/1965 Ehsichalger ..... 361/396 X

3,330,995	7/1967	Rayburn	361/393
3,418,533	12/1968	Perotto	361/413 X
3,555,364	1/1971	Mastovich	361/414 X
3,615,870	10/1971	Crouthamel	361/393 X
3,704,455	11/1972	Scarborough	340/173 SP
3,705,332	12/1972	Parks	174/68.5
3,777,221	12/1973	Tatsuko	361/414 X
4,200,900	4/1980	McGeroge	361/413 X

Primary Examiner—Richard R. Kucia  
Attorney, Agent, or Firm—Joseph E. Ruz; Henry S. Miller

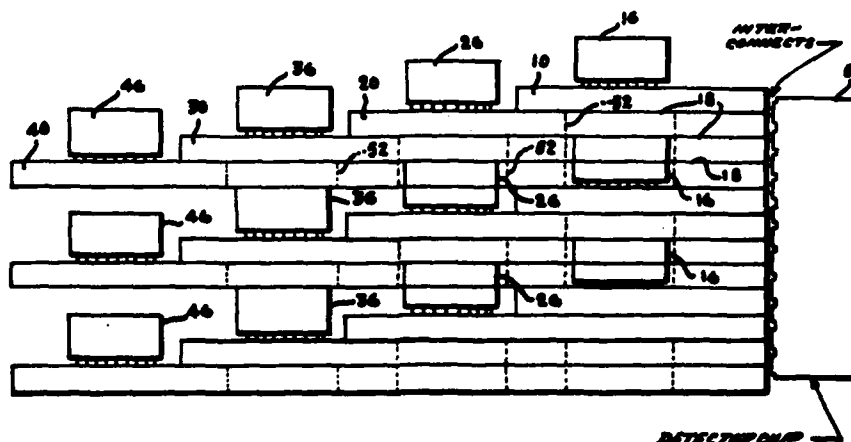
### [57] ABSTRACT

Infrared detector arrays have focal plan processing in modular form mounted on stacked boards, where the processing integrated circuits are recessed in adjacent boards.

1 Claim, 3 Drawing Figures

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JAT 00340



# PATENT ABSTRACT

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## United States Patent [19]

Edwards

[11] 4,283,988

[45] Aug. 18, 1981

### [54] TAIL CARRIAGE OF STORES

[75] Inventor: Kenneth M. Edwards, Niceville, Fla.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 66,358

[22] Filed: Aug. 14, 1979

[51] Int. Cl.: F41F 5/02

[52] U.S. Cl.: 89/1.5 R; 89/1.5 C; 102/2; 102/382

[58] Field of Search: 89/1 A, 1.5 R, 1.5 C, 89/1.5 H; 102/2, 3; 244/137 R, 118.1, 136

### [56] References Cited

#### U.S. PATENT DOCUMENTS

2,470,120	5/1949	Walker	89/1.5 C
2,723,093	11/1955	Price et al.	244/137 R
3,056,335	10/1962	Thieblot et al.	89/1.5 R
3,295,410	1/1967	Edwards	89/1.5 R
3,459,099	8/1969	Litz et al.	89/1.5 R

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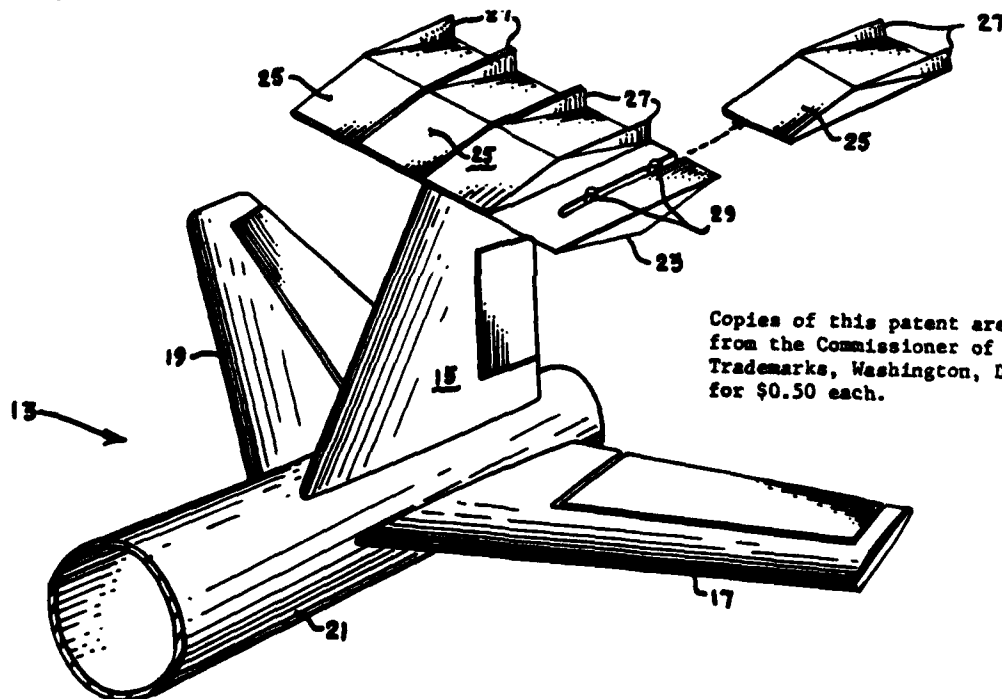
Primary Examiner—David H. Brown  
Attorney, Agent, or Firm—Donald J. Singer; Arsen Tashjian

### [57] ABSTRACT

A system for carrying and rearwardly launching and/or ejecting a store from an aircraft while flying at low altitudes. The store which may be in the form of a bomb, pod, missile, etc. is mounted at the top of one or more vertical stabilizers at the aft end of the aircraft. Aerodynamic lift and drag generated by the store shape causes the store to separate from the aircraft and move upward and aft therefrom. The store becomes a lifting body and gains altitude before falling on target thus enabling the carrying aircraft to remove itself from the blast area preventing possible damage to the aircraft.

2 Claims, 2 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,284,254**

**Rieben**

[45] **Aug. 18, 1981**

[54] **LOW PROFILE PRECISION ACTUATOR**

[75] **Inventor:** Ralph E. Rieben, Altamont, Tenn.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 121,076

[22] **Filed:** Feb. 13, 1980

[51] **Int. Cl.:** B64C 13/24; B64C 13/28

[52] **U.S. Cl.:** 244/75 R; 73/147;

74/520; 74/521; 244/90 R; 244/213

[58] **Field of Search:** 244/213, 203, 214, 210, 244/215, 90 R, 75 R; 74/469, 520, 521; 73/147

[56] **References Cited**

## U.S. PATENT DOCUMENTS

2,448,712	9/1948	Hampshire	244/90 R
2,861,758	11/1958	Howard	244/90 R
2,973,925	3/1961	Wiele	244/210
3,689,018	9/1972	Pelle et al.	74/520
3,894,618	7/1975	Enright	188/72.2

**Primary Examiner**—Galen L. Barefoot  
**Attorney, Agent, or Firm**—Donald J. Singer; Arsen Tashjian

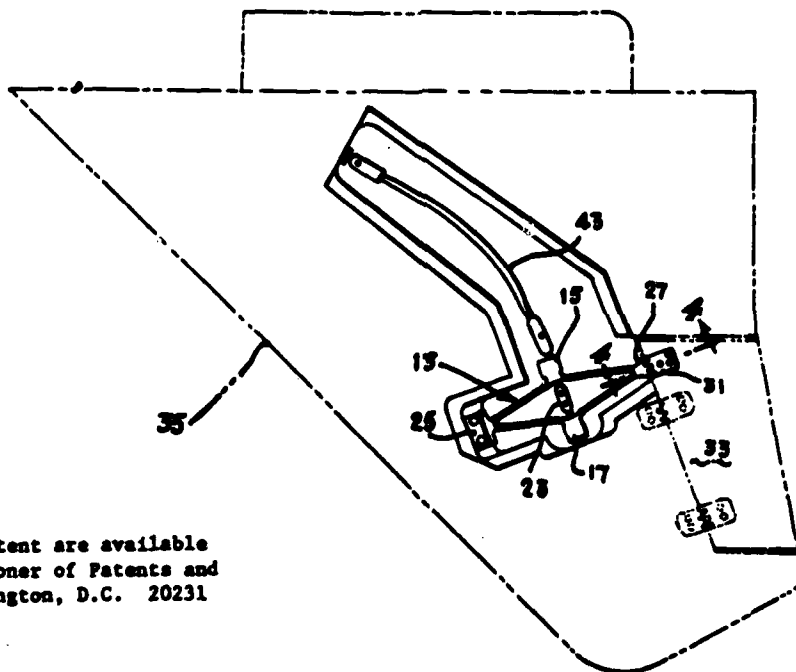
[57]

## ABSTRACT

A precision actuator of minimum thickness which provides high output force with low input torque and includes a single-piece metallic rhombus with a drive assembly made up of a right-hand threaded rod that passes through a right-hand threaded side apex of the rhombus connected by a coupling to a left-hand threaded rod that passes through a left-hand threaded side apex opposite the other threaded apex of the rhombus. The right-hand threaded and left-hand threaded rods are secured to the coupling such that the drive assembly rotates as a unit. Right-hand rotation of the drive assembly increases the distance between the threaded apexes while drawing the end apexes closer together and left-hand rotation of the drive assembly draws the threaded apexes closer together forcing the end apexes further apart.

4 Claims, 4 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]

**Horne, Jr. et al.**

[11] **4,284,612**

[45] **Aug. 18, 1981**

**[54] PREPARATION OF SiC WHISKERS**

[75] **Inventors:** **Ottis J. Horne, Jr., Johnson City;**  
**Lloyd I. Grindstaff, Elizabethton,**  
**both of Tenn.**

[73] **Assignee:** **Great Lakes Carbon Corporation,**  
**New York, N.Y.**

[21] **Appl. No.:** **115,683**

[22] **Filed:** **Jan. 28, 1980**

[51] **Int. Cl.:** ..... **C01B 31/36**

[52] **U.S. Cl.:** ..... **423/348; 106/44**

[58] **Field of Search:** ..... **423/345; 106/44**

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

3,285,696 11/1966 Tsumoda .  
3,412,062 11/1968 Johnson et al .  
3,503,708 3/1970 Spry .  
4,014,725 3/1977 Schulz .

**FOREIGN PATENT DOCUMENTS**

48-22920 7/1973 Japan ..... 423/345  
998089 7/1965 United Kingdom .

**OTHER PUBLICATIONS**

Lee et al., "Am. Ceram. Soc. Bull.", vol. 54, No. 2,  
1975, pp. 195-198.

*Primary Examiner*—Jack Cooper  
*Attorney, Agent, or Firm*—Adrian J. Good

**[57] ABSTRACT**

Organic fibers are oxidized, ground and blended with a source of silica. Heat treatment of the blend in the range of 1400° to 1700° C. results in the formation of SiC whiskers. Various fibers including PAN, pitch and rayon which can be processed to form carbon and/or graphite fibers can be used as the carbon source. Ashed rice hulls as the source of silica are blended with the chopped fiber to form the SiC whiskers.

**16 Claims, No Drawings**

Requests for licensing information should be addressed to:  
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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,284,961

Landau

[45] Aug. 18, 1981

[54] DIGITAL POSITION TRANSDUCER  
INCLUDING VARIABLE TUNING ELEMENT  
OSCILLATOR

[75] Inventor: Darrell W. Landau, Garden Grove,  
Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 76,893

[22] Filed: Sep. 19, 1979

[51] Int. Cl. .... G01R 27/26; G03K 3/03;  
H03K 3/354

[52] U.S. Cl. .... 331/65; 324/208;  
331/111; 331/181; 331/DIG. 3

[58] Field of Search .... 331/65, 108 D, 111,  
331/181, DIG. 3; 324/207, 208

[56] References Cited

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3,756,081 9/1973 Young ..... 331/65 X  
3,891,918 6/1975 Ellis ..... 331/181 X

## OTHER PUBLICATIONS

RCA COS/MOS Integrated Circuits Manual, Techni-  
cal Series CMS-271, pp. 89-94, 1972.

Primary Examiner—Siegfried H. Grimm  
Attorney, Agent, or Firm—Donald J. Singer; William  
Stepanishen

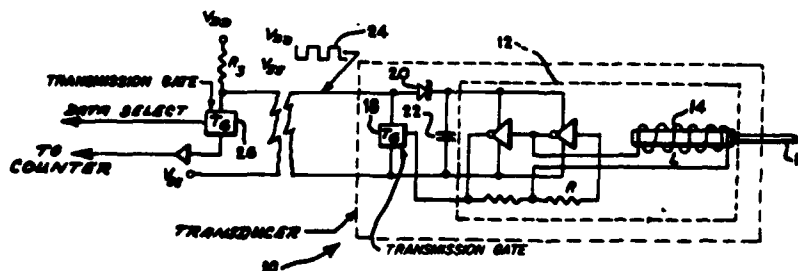
[57] ABSTRACT

A digital position transducer apparatus utilizing a  
moveable slug-tuned inductor to measure the displace-  
ment or movement of a mechanical component. The  
value of the inductor controls an oscillator's output  
frequency which is converted to a digital word propor-  
tional to the displacement of a mechanical component.

8 Claims, 2 Drawing Figures

Requests for licensing information should be addressed to:  
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# PATENT ABSTRACT

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**United States Patent** [19]

**Maier, Jr.**

[11] **4,284,964**

[45] **Aug. 18, 1981**

**[54] SELF-DETERMINATION OF LASER  
FREQUENCY**

[75] **Inventor:** Ree J. Maier, Jr., Bosque Farms, N. Mex.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 36,252

[22] **Filed:** May 4, 1979

[51] **Int. Cl.:** H01S 3/10

[52] **U.S. Cl.:** 331/94.5 S

[58] **Field of Search:** 331/94.5 C, 94.5 D, 331/94.5 S; 356/346

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

3,879,130 4/1975 Greenstein ..... 356/350  
4,165,183 8/1979 Hall et al. .... 356/346

**Primary Examiner**—William L. Sikes

**Assistant Examiner**—Leon Scott, Jr.

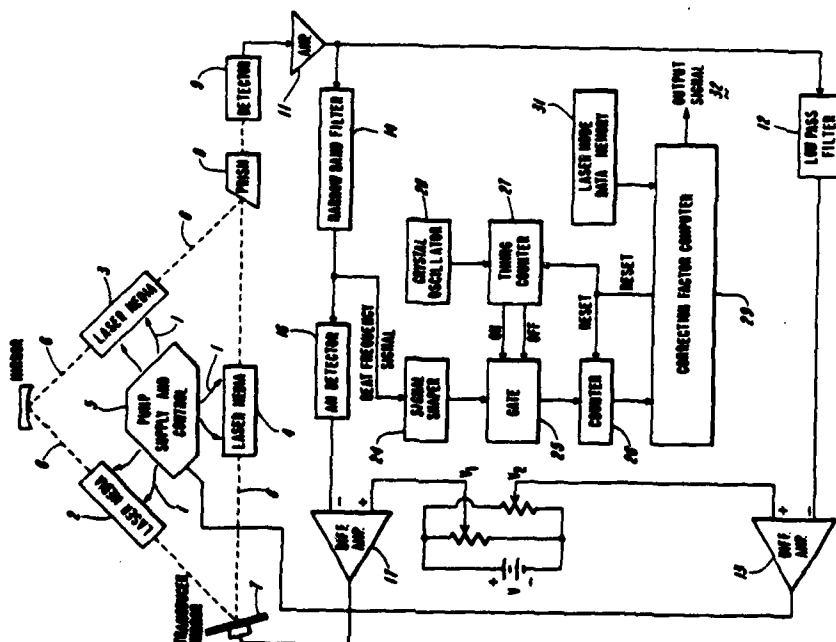
**Attorney, Agent, or Firm**—Donald J. Singer; Thomas L. Kundert

Requests for licensing information should be addressed to:  
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**[57] ABSTRACT**

An apparatus utilizing a resonant laser cavity to create two modes of oscillation and lock the operation of the cavity onto the mode pair. The cavity pathlength is adjusted using a feedback loop which detects the beat frequency of the pair of modes and tracks a feedback signal which is functionally proportional to the product of the square root of the mode intensities. In one variation beat frequency pulses are accumulated for a period determined by a time reference which is more accurate than the frequency gap between adjacent pairs of modes, but is less accurate than the precision to which the individual modes are known once the specific pair is designated. The exact frequency of each mode is known a priori from its wavelength to the sharpness of the atomic line. In this manner, a time reference of nominal accuracy may be used to designate the pair of modes present in the laser cavity, and in doing so, simultaneously designates their frequency to a high degree of accuracy. If laser operation is interrupted after calibration, the apparatus can ascertain the new mode frequencies and compute a compensating correction factor.

**2 Claims, 4 Drawing Figures**



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**JAT 00345**



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,285,111

Dubach

[45] Aug. 25, 1981

[54] BEARING PULLER ALIGNMENT TOOL

[76] Inventor: Harry Dubach, 314 N. 700 E.,  
Kaysville, Utah 84037

[21] Appl. No.: 163,136

[22] Filed: Jan. 26, 1980

[51] Int. Cl. B23P 19/04

[52] U.S. Cl. 29/263

[58] Field of Search 29/256, 258, 263, 264,  
29/265, 266, 280

[56] References Cited

U.S. PATENT DOCUMENTS

1,438,039	12/1922	Hurlbut	29/263
1,935,218	11/1933	Umbach	29/256 X
3,058,207	10/1962	Wilson	29/264 X
4,065,844	1/1978	Lieser et al.	29/258

Primary Examiner—Robert C. Watson  
Attorney, Agent, or Firm—Donald J. Singer; Arsen  
Tashjian

[57] ABSTRACT

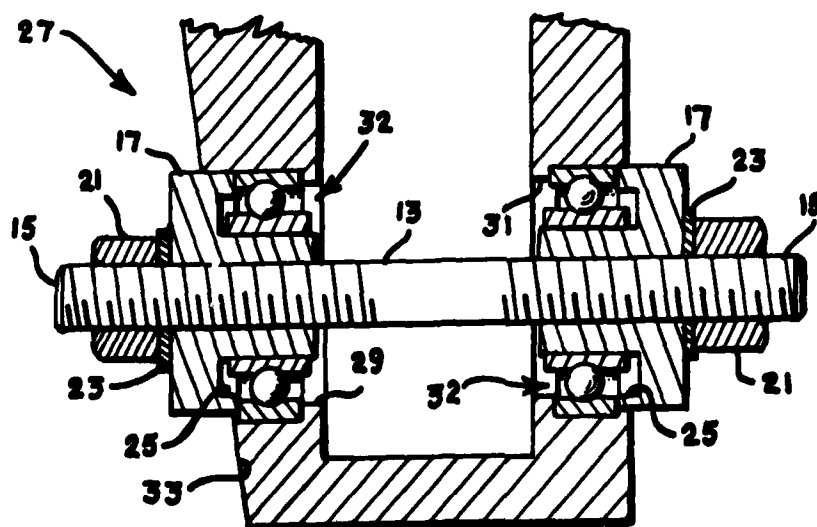
The tool is useful for the replacement of the lateral control torque tube bearings on high performance aircraft. The bearings are pulled into position into the bulkhead in a straight line thereby preventing them from becoming jammed because of the angle of the bulkhead surface into which the bearings are to be installed. The tool self-aligns the bearings without putting pressure on the bearing race thereby preventing the possibility of damage to the bearing and since the use of a shoulder driver and hammer are no longer required, damage to the bearing and/or aircraft is virtually eliminated.

1 Claim, 4 Drawing Figures

RIGHTS OF THE GOVERNMENT

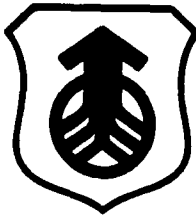
The invention described herein may be manufactured and used by or for the Government of the United States for all government purposes without the payment of any royalty.

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# PATENT ABSTRACT

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## United States Patent [19]

Jones

[11] 4,285,633

[45] Aug. 25, 1981

[54] BROAD SPECTRUM VIBRATION DAMPER  
ASSEMBLY FIXED STATOR VANES OF  
AXIAL FLOW COMPRESSOR

3,887,299 6/1975 Profant  
3,893,782 7/1975 Pierpoline et al.  
4,142,827 3/1979 Viciguerra 415/193

[75] Inventor: Carmen B. Jones, West Chester,  
Ohio

Primary Examiner—Robert E. Garrett  
Attorney, Agent, or Firm—Donald J. Singer; Arsen  
Tashjian

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

### [57] ABSTRACT

[21] Appl. No.: 88,503

[22] Filed: Oct. 26, 1979

[51] Int. Cl.<sup>3</sup> F03B 3/18

[52] U.S. Cl. 415/191

[58] Field of Search 415/191, 192, 193, 194,  
415/195

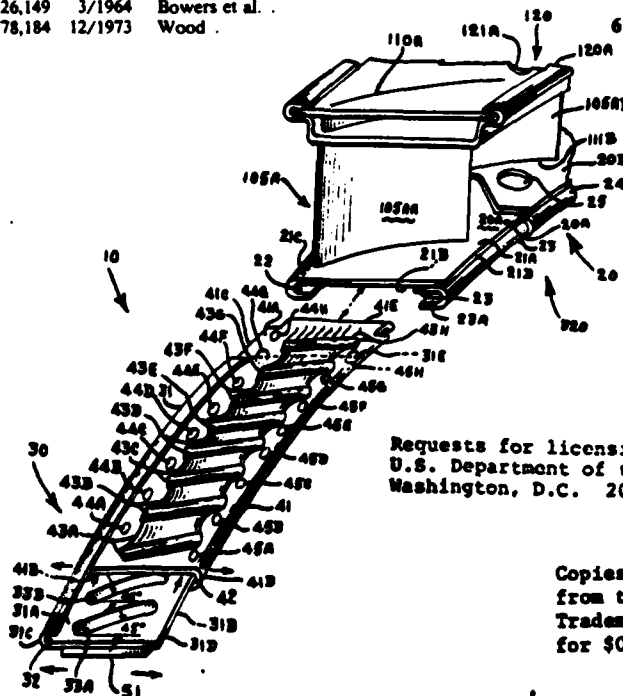
### [56] References Cited

#### U.S. PATENT DOCUMENTS

2,610,823	9/1952	Knowlton	
2,724,544	11/1955	Hardigg	415/194
2,930,521	3/1960	Koehring	
2,931,622	4/1960	Klompas et al.	415/193
2,955,799	10/1960	Oickle	
3,034,762	5/1962	Fanti et al.	
3,042,365	7/1962	Curtis et al.	
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3,126,149	3/1964	Bowers et al.	
3,778,184	12/1973	Wood	

Undesirable vibrations of stator airfoil vanes circumferentially disposed in annular rows, and fixed at their ends by a sector outer shroud and a sector inner shroud, in an axial flow compressor of gas turbine engine are damped by a damper assembly that is fitted into, and is frictionally engaged, in the sector inner shroud which, in turn, is segmented to assist in this damping. The damper assembly includes: A metal seal strip member having indentations; a metal sine wave-shaped damper and spring member that is complementary to, and is engaged with, the seal strip member; and, a honeycomb member affixed to the bottom surface of the seal strip member. The vibrations cause movement of the shroud segments which, in turn, cause rubbing contact; and, the resulting friction heat energy is conducted through the metal components of the damper assembly to the thermal sink that is the through-flowing air in the compressor.

6 Claims, 5 Drawing Figures



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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,294,243**

**Ernsting et al.**

[45] **Oct. 13, 1981**

**[54] RESPIRATORS**

**[75] Inventors:** John Ernsting, Fleet; Thomas R. Morgan, Farnborough; Leonard F. W. Palmer, Aldershot; Alfred J. Rivers, Church Crookham, all of England; Stephen M. Robson, RAF St. Athan, Wales

**[73] Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

**[21] Appl. No.:** 967,122

**[22] Filed:** Dec. 8, 1978

**[51] Int. Cl.:** A62B 7/00

**[52] U.S. Cl.:** 128/201.18; 128/206.21

**[58] Field of Search:** 128/201.18, 201.23, 128/201.27, 205.25, 207.11, 206.12, 206.17, 201.24, 201.25

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

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3,438,060 4/1969 Lobelle et al. .... 128/201.23

4,077,068 3/1978 Anderson ..... 128/207.11  
4,090,511 5/1978 Gray ..... 128/201.18

**FOREIGN PATENT DOCUMENTS**

891655 10/1953 Fed. Rep. of Germany ..... 128/201.18  
754529 4/1954 Fed. Rep. of Germany ..... 128/201.18  
1222570 10/1968 United Kingdom ..... 128/201.18

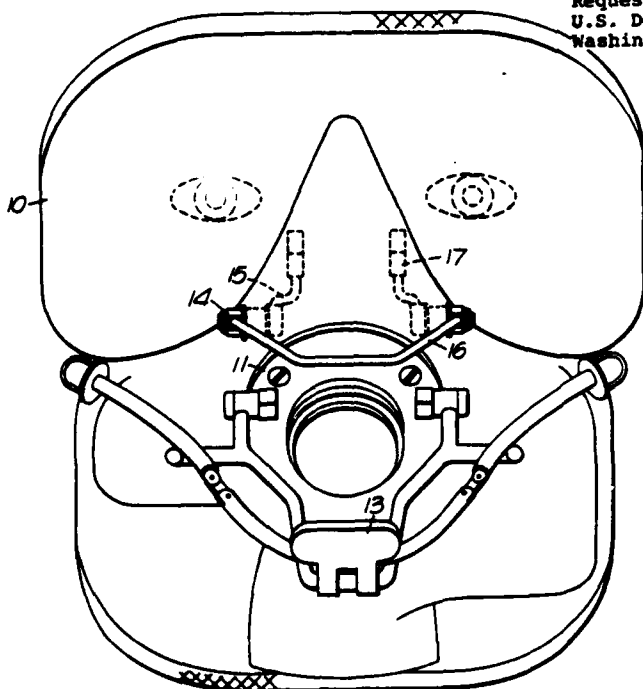
*Primary Examiner*—Harold J. Tudor  
*Attorney, Agent, or Firm*—Donald J. Singer; Thomas L. Kundert

**[57] ABSTRACT**

The invention provides a nose occlusion facility on respirators of the type in which a hood and visor combination envelops the head of a wearer and carries an oronasal mask for supplying respiratory gas to the wearer. The nose occlusion facility is manually operable and comprises a lever device mounted on the exterior of the visor and associated with arms operative to pinch the wearer's nose in the region of the lobes thereof.

**8 Claims, 2 Drawing Figures**

Requests for licensing information should be addressed to:  
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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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United States Patent [19]

[11] 4,294,508

Husbands

[45] Oct. 13, 1981

## [54] OPTICAL MULTIPLEXER/DEMULTIPLEXER

[75] Inventor: Charles R. Husbands, Acton, Mass.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 68,822

[22] Filed: Aug. 22, 1979

[51] Int. Cl. G02B 5/14

[52] U.S. Cl. 350/96.15; 250/227

[58] Field of Search 350/96.15, 96.16, 169; 250/227

## [56] References Cited

### U.S. PATENT DOCUMENTS

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3,777,149	12/1973	Marcatili	350/96.15
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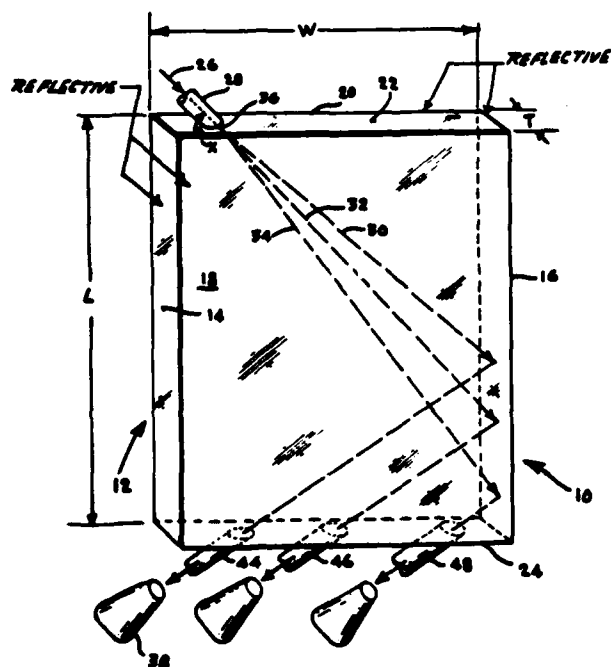
mode Optical Fibers," W. J. Tomlinson, Applied Optics, vol. 16, #8, 8/1977, pp. 2180-2194.

Primary Examiner—John K. Corbin  
Assistant Examiner—Rodney Bovernick  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

## [57] ABSTRACT

An optical multiplexer/demultiplexer having a body made up of a pair of reflective and a pair of non-reflective sides. As a demultiplexer a beam containing a plurality of optical wavelengths is separated within the body into its constituent wavelengths utilizing the principles of optical refraction and optical reflection. By extending the length of the body, sufficient physical separation can be realized between each of the constituent wavelengths to allow detection of each wavelength by specially separated detectors. As a multiplexer a plurality of beams, each having a single wavelength, are combined to provide a single output beam having a plurality of wavelengths contained therein.

17 Claims, 4 Drawing Figures



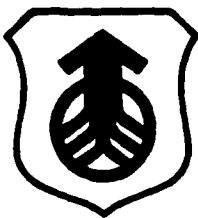
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JAT 00349





**P**ATENT  
**A**BSTRACT

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**United States Patent** [19]

Frankel et al.

[11] **4,297,152**

[45] **Oct. 27, 1981**

[54] **ENERGETIC MONOPROPELLANT**

[75] Inventors: Milton B. Frankel, Tarzana; Harry A. Arbit, Encino; Glen D. Arts, Canoga Park; John C. Gray, Ventura, all of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 110,888

[22] Filed: Jan. 10, 1980

[51] Int. Cl.<sup>3</sup> ..... C06B 25/00

[52] U.S. Cl. .... 149/88; 149/119; 60/205

[58] Field of Search ..... 362/88, 119; 60/205

[56] **References Cited**

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*Primary Examiner*—Stephen J. Lechert, Jr.

*Attorney, Agent, or Firm*—Donald J. Singer; William J. O'Brien

[57] **ABSTRACT**

An energetic liquid monopropellant comprising a mixture of bis (2,2-dinitropropyl) acetal; bis (2,2-dinitropropyl) formal; and bis (2,2,2-fluorodinitroethyl) formal.

**4 Claims, No Drawings**

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**JAT 00351**



# PATENT ABSTRACT

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## United States Patent [19]

Paciorek et al.

[11] 4,297,510

[45] Oct. 27, 1981

[54] UNSYMMETRICAL  
DIPHOSPHATETRAAZACYCLOOCTATETRA-  
AENES

[75] Inventors: Kazimiera J. L. Paciorek, Corona  
Del Mar; Reinhold H. Kratzer,  
Irvine; Thomas I. Ito, Fountain  
Valley; James H. Nakahara, Irvine,  
all of Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 163,135

[22] Filed: Jun. 26, 1980

[51] Int. Cl.<sup>3</sup> ..... C07F 9/22; C10M 1/44

[52] U.S. Cl. .... 564/13; 252/49.9;  
252/73; 252/400 A; 252/389 A

[58] Field of Search ..... 564/13; 252/49.9, 400 A,  
252/389 A

### [56] References Cited

#### U.S. PATENT DOCUMENTS

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Zhur. Obsch. Khim., vol. 32, No. 9, (1962).

Primary Examiner—Charles F. Warren

Attorney, Agent, or Firm—Donald J. Singer; William J.  
O'Brien

### [57] ABSTRACT

A method for preparing unsymmetrical diphosphatetraazacyclooctatetraenes and the novel products produced thereby. The synthesis involves an interaction between an imido-tetraaryl-diphosphinic acid trihalide and a perfluorinated imidoamidine in the presence of an acid acceptor.

2 Claims, No Drawings

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,288,845

Finsness et al.

[45] Sep. 8, 1981

[54] AERIAL REFUELING RECEPTACLE  
FLOODLIGHTS-SPOILER AND FUSELAGE,  
NOSE MOUNTED

Assistant Examiner—Irwin Gluck  
Attorney, Agent, or Firm—Donald J. Singer; Arsen  
Tashjian

[75] Inventors: Wilma L. Finsness, Bellevue; Richard  
I. McMonagle, Bothell; Edward M.  
Sedenquist, Seattle, all of Wash.

[57] ABSTRACT

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

A floodlight illumination system, in structural combina-  
tion with a fuel-receiving aircraft having an aerial re-  
fueling receptacle, that permits efficient and effective  
in-flight night refueling of the aircraft. The illumination  
system comprises: a selectively lightable, retractable  
aerodynamically shaped spoiler mounted on the nose of  
the aircraft which illuminates the top surface of the  
refueling receptacle, and, two similar (i.e., symmetri-  
cally shaped and dimensioned), selectively lightable  
fairings mounted on the port and starboard sides of the  
nose of the aircraft, parallel to airflow lines, with one  
fairing illuminating the port side surface of the refueling  
receptacle, and with the other fairing illuminating the  
starboard side surface of the refueling receptacle. The  
result is adequate and glare-free lighting of the refueling  
receptacle of the receiving aircraft, which, in turn, al-  
lows the operator of the refueling boom of the refueling  
aircraft to refuel the receiving aircraft without the loss  
of depth of perception, and without the glare, which  
ordinarily occur when a receiving aircraft is conven-  
tionally illuminated for in-flight night refueling.

[21] Appl. No.: 64,932

[22] Filed: Aug. 8, 1979

[51] Int. Cl. B64D 47/02; B64D 37/00

[52] U.S. Cl. 362/63; 244/135 A;  
362/62; 362/233; 362/250; 362/390

[58] Field of Search 362/62, 63, 233, 250,  
362/390; 244/135 A

[56] References Cited

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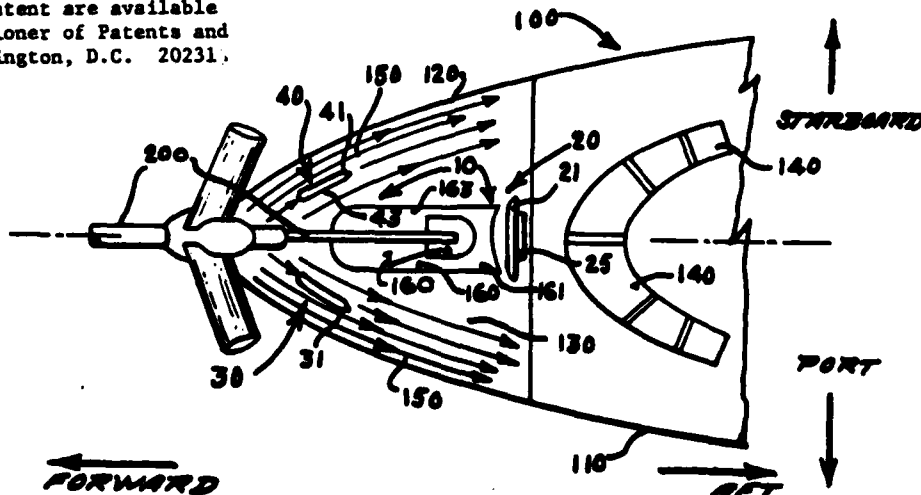
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Primary Examiner—Edward A. Miller

6 Claims, 8 Drawing Figures

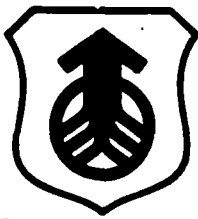
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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,298,858

Romanski

[45] Nov. 3, 1981

## [54] METHOD AND APPARATUS FOR AUGMENTING BINARY PATTERNS

[75] Inventor: John G. Romanski, Kingsville, Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 134,718

[22] Filed: Mar. 27, 1980

[51] Int. Cl.<sup>3</sup> ..... G06K 9/52

[52] U.S. Cl. .... 340/146.3 MA; 358/260

[58] Field of Search ..... 340/146.3 AG, 146.3 MA,  
340/146.3 R; 358/260, 261, 262

## [56] References Cited

### U.S. PATENT DOCUMENTS

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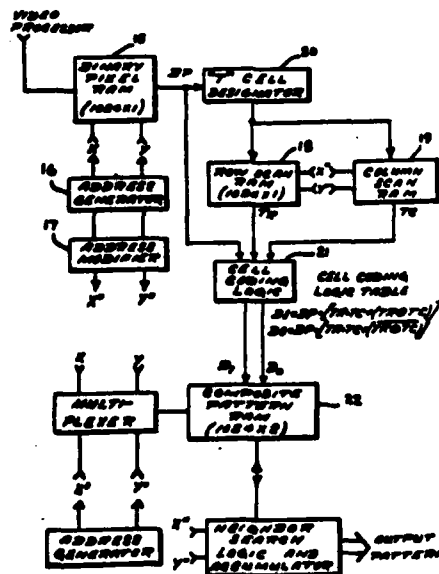
Primary Examiner—Leo H. Boudreau  
Attorney, Agent, or Firm—Donald J. Singer; Willard R.  
Matthews, Jr.

## [57] ABSTRACT

The conversion of simple "1" and "0" PIXELS of a binary pattern into PIXELS with numerical values dependent upon relative location in the original pattern is realized by a technique that identifies various types of PIXELS including the edge PIXELS in contiguous groups of "1" PIXELS. A multilevel pattern using the various types of PIXELS is developed and a numerical value assigned to each PIXEL. The numerical value for each PIXEL is a function of its own type and the types of its near neighbor PIXELS. Pattern measurements for the augmented pattern are less sensitive to erroneous cell deletions than for simple binary patterns. The technique is implemented by a simple mechanization for generating the augmented pattern. The mechanization is characterized by operations that are easily implemented in a real time environment using standard digital logic devices.

4 Claims, 4 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

Aloi et al.

[11] 4,299,158

[45] Nov. 10, 1981

### [54] LAST ROUND DETECTION DEVICE

[75] Inventors: Anthony J. Aloi, Richmond; Robert J. Fritz, Burlington, both of Vt.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 97,462

[22] Filed: Nov. 26, 1979

[51] Int. Cl. F41D 10/26; F41D 10/30

[52] U.S. Cl. 89/137; 89/33 D

[58] Field of Search 89/33 D, 137

[56] References Cited

#### U.S. PATENT DOCUMENTS

2,993,415 7/1961 Panizzi et al. 89/33 D

Primary Examiner—Stephen C. Bentley

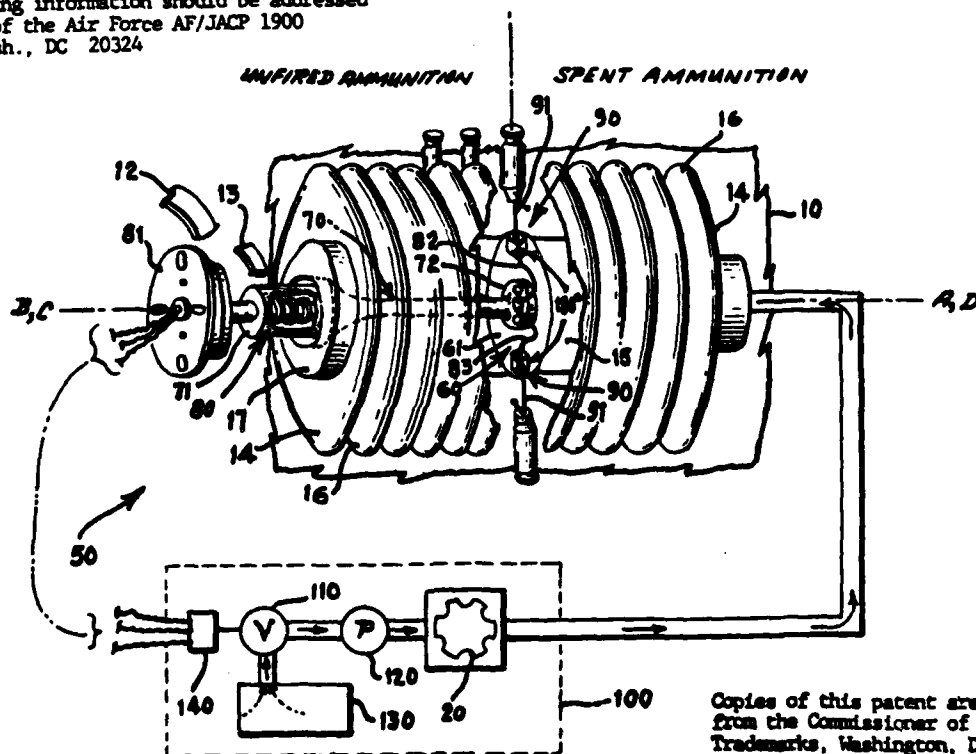
Attorney, Agent, or Firm—Donald J. Singer; Arsen Tashjian

### [57] ABSTRACT

The device is for use with an ammunition storage drum for a modern multi-barrel high rate-of-fire machine gun (i.e., "Gatling" type gun) system, in which unfired ammunition rounds are transported from the drum to the gun, and the cases of the spent ammunition are returned from the gun to the drum. When two generally, oppositely positioned spent ammunition sensors within the drum simultaneously detect spent ammunition in the drum, a signal is sent to the gun control unit in time to cut off power. The device prevents spent ammunition from being chambered in the gun, and as a result also permits higher rates-of-fire by the gun.

6 Claims, 6 Drawing Figures

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## United States Patent [19]

Carignan et al.

[11] 4,299,166

[45] Nov. 10, 1981

### [54] CONTAINMENT AND RELEASE DEVICE FOR FLUIDS

[75] Inventors: Donald J. Carignan, Chelmsford;  
William Lewis, Andover, both of  
Mass.

[73] Assignee: The United States of American as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 96,720

[22] Filed: Nov. 21, 1979

#### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 866,741, Jan. 3, 1978,  
abandoned.

[51] Int. Cl. F24B 11/24

[52] U.S. Cl. 102/501; 89/1 B;  
102/336; 102/334; 102/505; 102/293

[58] Field of Search 89/1 B; 102/90, 89 CD,  
102/6, 34.4, 37.6, 65, 66, 28 EB

#### [56] References Cited

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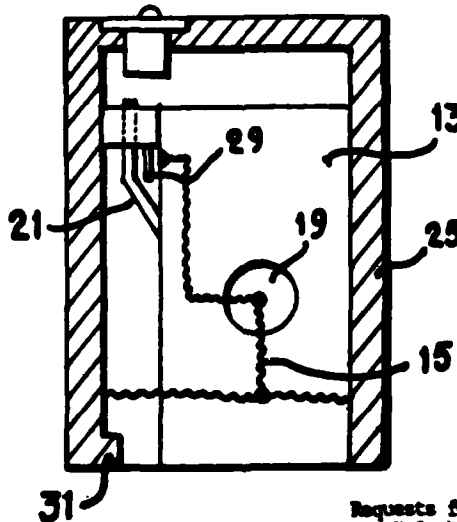
674645 11/1963 Canada ..... 102/37.6

Primary Examiner—David H. Brown  
Attorney, Agent, or Firm—Donald J. Singer; Arsen  
Tashjian

#### [57] ABSTRACT

A dispenser retains a hermetically sealed metal canister which holds a pyrophoric fluid, radar chaff, other electronic countermeasure materials or a combination thereof for ejection from an aircraft. Several openings in the canister are sealed with Pyrofuze foil material closures and a Pyrofuze wire braid is interconnected between each of the closures and the canister in close proximity to a Pyrofuze delay braid having one end thereof fixedly attached to the canister. A safety tab on one corner of the canister extends downward between the delay braid and the wire braid to prevent cross ignition until the canister is fully ejected from the dispenser. When a gas producing squib on the dispenser is fired, the Pyrofuze delay braid is ignited by the flame front from the squib and the canister is forced from the dispenser causing the safety tab to be automatically removed from the canister. This allows the delay braid to ignite the Pyrofuze wire braid which burns to each of the closures causing them to burn away thereby releasing and igniting the pyrophoric material from the canister.

4 Claims, 5 Drawing Figures



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United States Patent [19]

[11] 4,299,482

Task

[45] Nov. 10, 1981

[54] MEASUREMENT OF WINDSCREEN  
DISTORTION USING OPTICAL  
DIFFRACTION

[75] Inventor: Harry L. Task, Montgomery  
County, Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 90,383

[22] Filed: Nov. 1, 1979

[51] Int. Cl.: G01B 9/00

[52] U.S. Cl.: 356/124

[58] Field of Search 356/124, 125, 347;  
350/162 R, 162 SF

[56] References Cited

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Primary Examiner—Conrad J. Clark  
Attorney, Agent, or Firm—Donald J. Singer; Casimer K. Salys

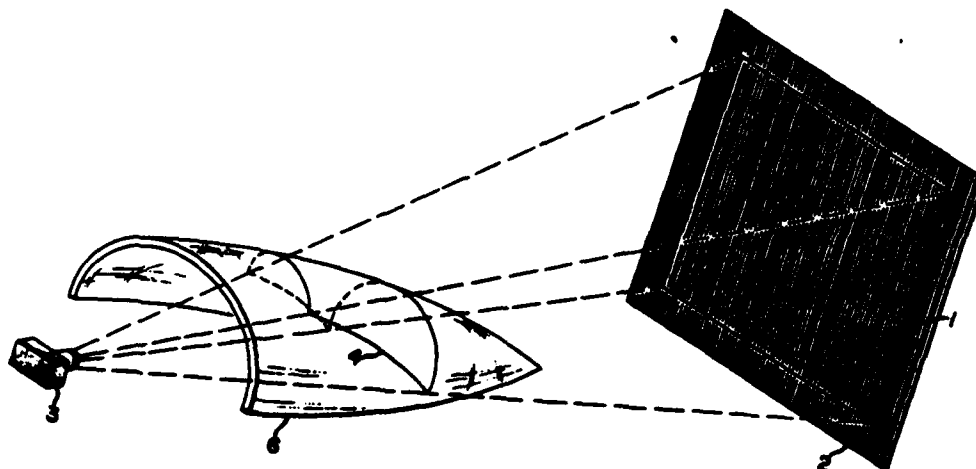
[57] ABSTRACT

A measurement apparatus and method for detecting, resolving and quantifying the distortion caused by a relatively large region of a distorting optically transparent medium. A precisely defined pattern is viewed through the transparent medium to introduce the distortion effects. The altered pattern is photographically recorded in thin film transparency format. A beam of coherent luminous energy projected through the transparency, once focused, produces a Fraunhofer diffraction pattern which is the Fourier transform of the original pattern. Conventional distortion characteristics in the Fourier domain appear in a form more amenable to quantification and analysis. The character and magnitude of the distortion is readily ascertained by comparing the transforms of distorted and undistorted patterns, yielding quantitative data comparable to conventional distortion effects in terms of grid line slope and lens factor.

4 Claims, 7 Drawing Figures

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## United States Patent [19]

Stout

[11] 4,299,546

[45] Nov. 10, 1981

### [54] VANE CONTROL BEARING ASSEMBLY

[76] Inventor: Robert L. Stout, 5860 Charlesgate Rd., Dayton, Ohio 45424

[21] Appl. No.: 99,786

[22] Filed: Dec. 3, 1979

[51] Int. Cl.<sup>3</sup> ..... F01C 11/00; F01C 21/00

[52] U.S. Cl. .... 418/13; 418/212;  
418/254; 418/263; 418/264

[58] Field of Search ..... 418/13, 212, 213, 254,  
418/263, 264

### [56] References Cited

#### U.S. PATENT DOCUMENTS

478,271 7/1892 Beard ..... 418/212  
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3,114,324 12/1963 Baker, Jr. .... 418/264  
3,904,327 9/1975 Edwards et al. .... 418/264

Primary Examiner—John J. Vrablik

Attorney, Agent, or Firm—Donald J. Singer; Richard J. Killoren

### [57]

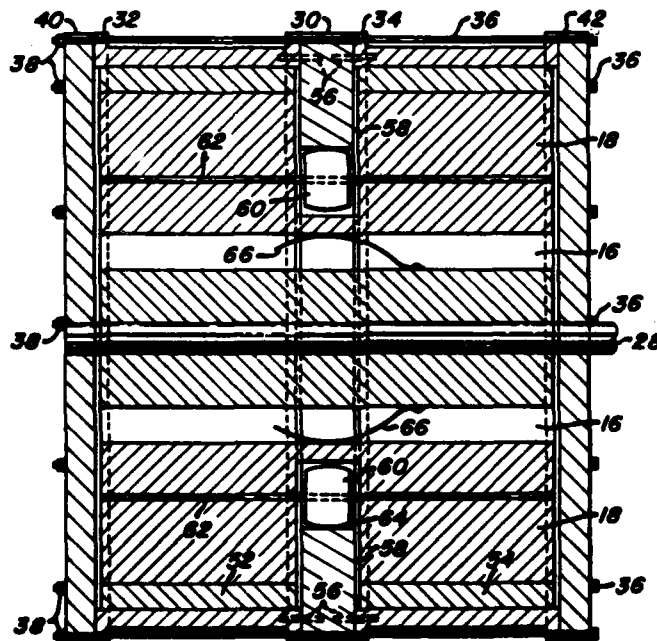
### ABSTRACT

A rotary vane gas cycle apparatus having radial slots in the vanes and with cam bearings supported in the slots. A camtrack member is supported by the rotary vane gas cycle apparatus housing and fits into the slots in the vanes and rotor to control the movement of the vanes during rotation of the rotor assembly within the chamber in the housing. Springs are provided in the rotor slots to support the weight of the vanes when the rotor assembly is not rotating.

1 Claim, 4 Drawing Figures

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## United States Patent [19]

Chiao et al.

[11] 4,302,667

[45] Nov. 24, 1981

### [54] NEAR MILLIMETER BISTABLE DEVICE

[75] Inventors: Raymond Y. Chiao, Kensington, Calif.; Harold R. Fetterman, Lexington, Mass.; Howard R. Schlossberg, Annandale, Va.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 85,663

[22] Filed: Oct. 17, 1979

[51] Int. Cl.<sup>1</sup> ..... G01J 1/32

[52] U.S. Cl. .... 258/205

[58] Field of Search ..... 250/201, 205, 216

### [56] References Cited

#### U.S. PATENT DOCUMENTS

4,092,530 5/1978 Wise ..... 250/205

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Quasi-Optical Schottky Diode Mixers" by Fetterman et al., Appl. Phys. Lett., Jul. 1978, pp. 151-154.

Primary Examiner—David C. Nelms  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

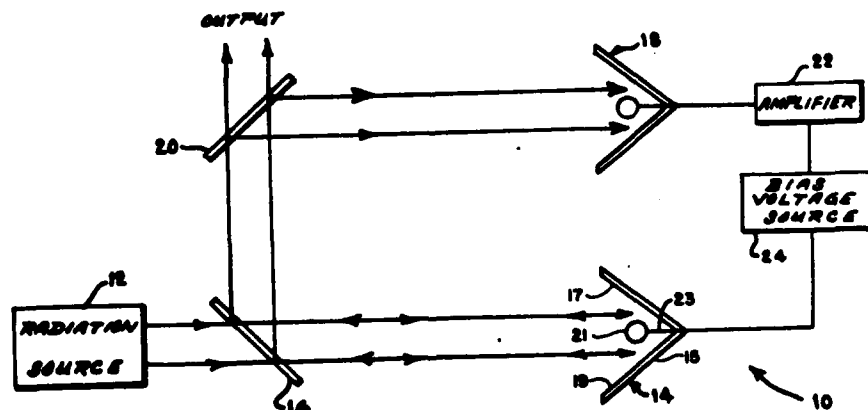
### [57] ABSTRACT

A near millimeter bistable device having a source of electromagnetic radiation in optical alignment with a variable reflecting means in the form of a Schottky barrier diode corner cube assembly. Interposed between the radiation source and the variable reflecting means is a beam splitter which reflects a beam of energy from the variable reflecting means through another beam splitter to a detector. The voltage produced by the detector is fed through a feedback circuit back to the variable reflecting means in order to vary the reflectivity thereof. In this manner the output of the device emanating from the other beam splitter has two stable conditions, one of relatively high output power and one of relatively low output power.

7 Claims, 1 Drawing Figure

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,302,791**

**Buchanan et al.**

[45] **Nov. 24, 1981**

**[54] POWER SUPPLY SEQUENCING  
APPARATUS**

[75] Inventors: **James E. Buchanan, Bowie; Daniel G. Damon, Laurel, both of Md.**

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **77,058**

[22] Filed: **Sep. 19, 1979**

[51] Int. Cl. **H02H 3/24**

[52] U.S. Cl. **361/86; 307/85; 361/90; 361/92**

[58] Field of Search **361/86, 88, 90, 92, 361/77; 307/86, 85, 87, 127, 251**

**[56] References Cited**

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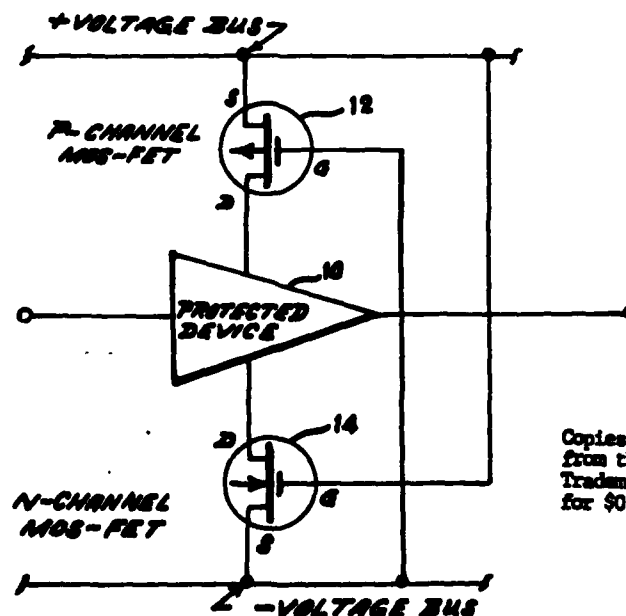
*Primary Examiner*—J. D. Miller  
*Assistant Examiner*—Reinhard J. Eisenzopf  
*Attorney, Agent, or Firm*—Donald J. Singer; William Stepanishen

**[57] ABSTRACT**

A power supply sequencing apparatus utilizing a pair of MOS-FET devices to simultaneously apply or remove the positive and negative power supply sources to an electronic unit.

**7 Claims, 3 Drawing Figures**

Requests for licensing information should be addressed to: U.S. Department of the Air Force AF/JACP 1900 Half Street S.W. Wash., DC 20324



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,302,796

Gustavson et al.

[45] Nov. 24, 1981

[54] **LOW DRAG INTEGRATION OF LASER  
BEAM POINTING DEVICE INTO AIRCRAFT**

[75] Inventors: Robert G. Gustavson, Los Angeles;  
Darold B. Cummings, Inglewood,  
both of Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 688,460

[22] Filed: May 27, 1976

[51] Int. Cl.: B64D 47/02

[52] U.S. Cl.: 362/62; 89/1 A;  
350/485; 362/259

[58] Field of Search: 350/26, 285, 301, 302;  
240/7.7, 61.05; 89/37.5 C, 41 L, 1 A; 362/259,  
62

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

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3,733,133 5/1973 Chapman ..... 350/285  
3,916,536 11/1975 Mohon et al. .... 350/285  
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Primary Examiner—Harvey E. Behrend

Attorney, Agent, or Firm—Donald J. Singer; Arsen  
Tashjian

[57] **ABSTRACT**

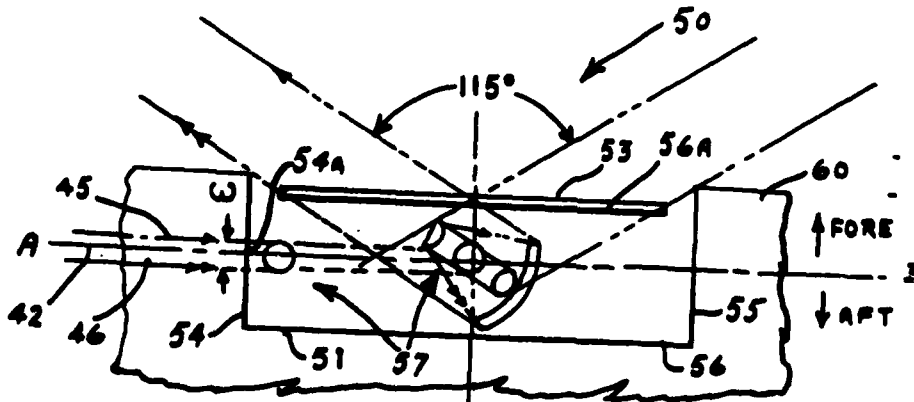
A laser beam pointing system, adapted for use in an  
aircraft. A preferred embodiment of the system in-

cludes: a laser beam source, within the aircraft, emitting  
a laser beam; and, a plurality of laser beam pointing  
devices in optical alignment with the laser beam. Each  
pointing device includes: a cylindrical shaped rotatable  
housing with a window, and either one or two rotatable  
optical means in optical alignment with the laser beam.  
One preferred arrangement is the mounting of one  
pointing device on the upper external surface of the  
aircraft fuselage, and of another pointing device on the  
lower external surface of the aircraft fuselage in a loca-  
tion oppositely disposed to and below the other point-  
ing device, with the two pointing devices being in paral-  
lel relationship to each other, and with the pointing  
devices mounted flush with the aerodynamically con-  
figured external surfaces of the fuselage. Another  
preferred arrangement is the mounting of one of the  
pointing devices on the leading edge of a left side fairing  
of the aircraft, and of another pointing device on the  
leading edge of the right side fairing of the aircraft  
angularly positioned with respect to the other pointing  
device, so that their respective axes are in the same  
plane and the axes would intersect if extended, and with  
the pointing devices mounted flush with the aerody-  
namically configured leading edge of the respective  
fairings. This inventive system, unlike the prior art,  
permits the emitted laser beam to be projected over a  
broad range of angles with little or no aerodynamic  
interference with the aircraft on which it is mounted  
and used.

8 Claims, 13 Drawing Figures

Requests for licensing information should be addressed  
to: U.S. Department of the Air Force AF/JACP 1900  
Half Street S.W. Wash., DC 20324.

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,305,248**

**Wright**

[45] **Dec. 15, 1981**

[54] **HOT SPIKE MIXER**

[75] **Inventor:** David L. Wright, Lake Park, Fla.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 82,354

[22] **Filed:** Oct. 5, 1979

[51] **Int. Cl.:** F02K 3/08

[52] **U.S. Cl.:** 60/261; 60/262;

415/217

[58] **Field of Search:** 60/261, 262; 415/216,  
415/217

[56] **References Cited**

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3,540,216 11/1970 Quillevere ..... 60/261  
3,595,024 7/1971 Kohler ..... 60/261  
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**Primary Examiner**—Douglas Hart

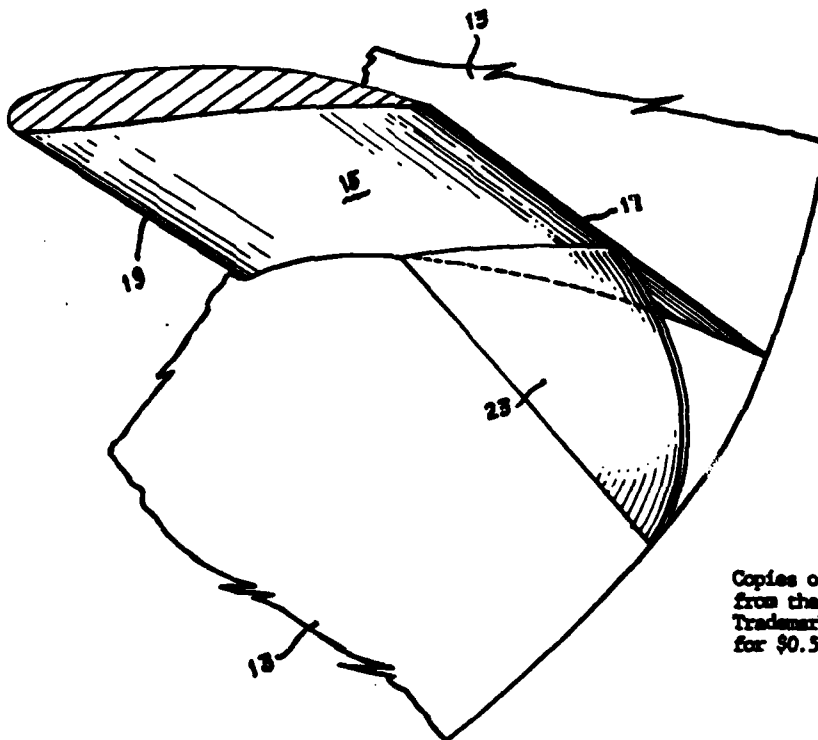
**Attorney, Agent, or Firm**—Donald J. Singer; Jacob N.  
Erich

[57] **ABSTRACT**

A mixer at the exit opening of a high performance jet engine to prevent premature migration of the core flow into the duct stream thereby operating to eliminate hot streaks in the augmentor and nozzle areas during augmentation. The mixer consists of a concave fillet positioned on the pressure side of the turbine exit guide vane and exhaust case at the trailing edge.

**1 Claim, 2 Drawing Figures**

Requests for licensing information should be addressed  
to: U.S. Department of the Air Force AF/JACP 1900  
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**United States Patent** [19]

[11] **4,305,307**

**Kiunke**

[45] **Dec. 15, 1981**

[54] **ANTI-BACKLASH GEAR DRIVE**

[75] **Inventor:** Paul C. Kiunke, Brea, Calif.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 104,924

[22] **Filed:** Dec. 18, 1979

[51] **Int. Cl.:** F16H 55/18

[52] **U.S. Cl.:** 74/409; 74/440

[58] **Field of Search:** 74/409, 440

[56] **References Cited**

## U.S. PATENT DOCUMENTS

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4,066,356	1/1978	Parker	355/63

**Primary Examiner**—C. J. Husar

**Assistant Examiner**—Conrad Berman

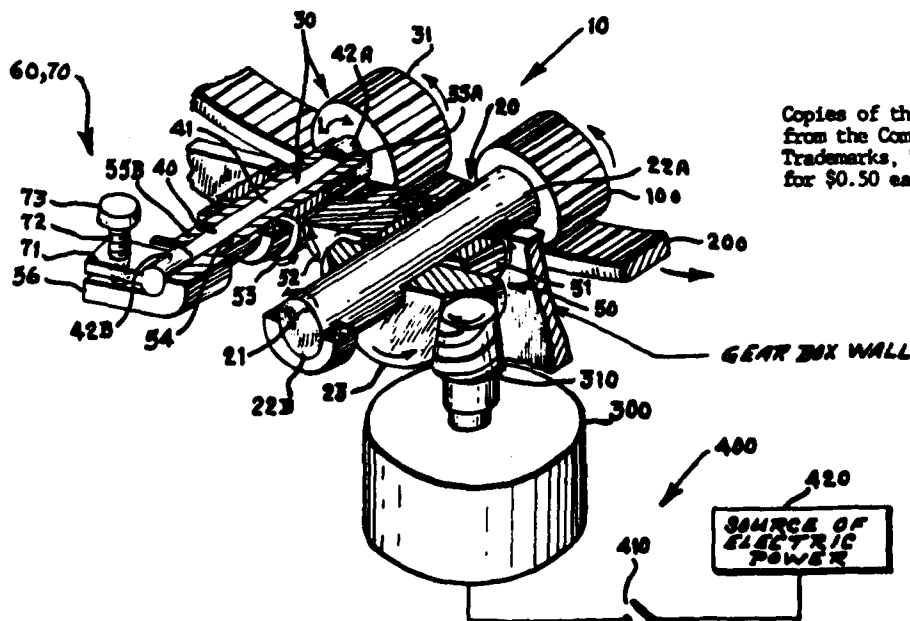
**Attorney, Agent, or Firm**—Donald J. Singer; Jacob N. Erlich

[57] **ABSTRACT**

In a gear train where there is backlash, the backlash is prevented by a gear drive which includes an anti-backlash driven pinion which is mounted on, or is otherwise connected to, a torsion spring shaft that is adjustable for twisting, and thereby, loading the anti-backlash driven gear.

**8 Claims, 1 Drawing Figure**

Requests for licensing information should be addressed to: US. Department of the Air Force AF/JACP  
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**United States Patent** [19]

[11] **4,308,521**

**Casasent et al.**

[45] **Dec. 29, 1981**

[54] **MULTIPLE-INVARIANT SPACE-VARIANT  
OPTICAL PROCESSING**

[56] **References Cited**  
**U.S. PATENT DOCUMENTS**

[75] **Inventors:** David P. Casasent; Demetri Psaltis,  
both of Pittsburgh, Pa.

3,270,188 8/1966 Ares ..... 364/517  
4,084,255 4/1978 Casasent et al. .... 350/162 SF  
4,138,190 2/1979 Bryngdahl ..... 350/162 SF  
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[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

**Primary Examiner**—Leo H. Boudreau  
**Attorney, Agent, or Firm**—Donald J. Singer; Sherman  
Goldman

[21] **Appl. No.:** 11,585

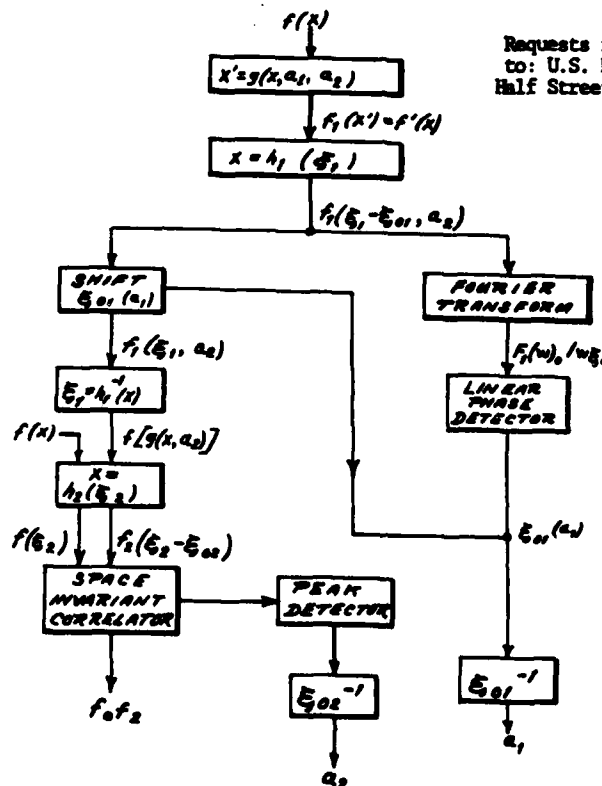
[57] **ABSTRACT**

[22] **Filed:** Feb. 12, 1979

A multiple-invariant, space variant optical processor in which two functions described by any number of separate distortion parameters can be correlated with no loss in signal-to-noise ratio of the correlation. The unknown distortion parameters can also be determined in this scheme. Experimental confirmation of the key step, determination of the non-linear phase portion of a complex optical transform can be provided.

[51] **Int. Cl.:** ..... G06K 9/40; G06G 9/00  
[52] **U.S. Cl.:** ..... 340/146.3 P; 340/146.3 Q;  
350/162 SF; 364/515; 364/822; 364/826  
[58] **Field of Search:** ..... 340/146.3 P, 146.3 Q;  
364/517, 571, 572, 574, 576, 604, 726, 728, 731,  
822, 826; 350/162 SF, 162 R

1 Claim, 2 Drawing Figures



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,309,072

Tweeddale

[45] Jan. 5, 1982

## [54] CABLE PROTECTION FROM RODENTS

[75] Inventor: Andrew D. Tweeddale, Issaquah, Wash.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 140,530

[22] Filed: Apr. 15, 1980

[51] Int. Cl. G02B 5/16; B32B 1/08

[52] U.S. Cl. 350/96.23; 174/136; 428/36; 428/174; 428/907

[58] Field of Search 428/36, 174, 907, 375; 52/101; 174/136; 350/96.23; 47/23.25; 138/121, 173

## [56] References Cited

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Primary Examiner—Paul J. Thibodeau  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

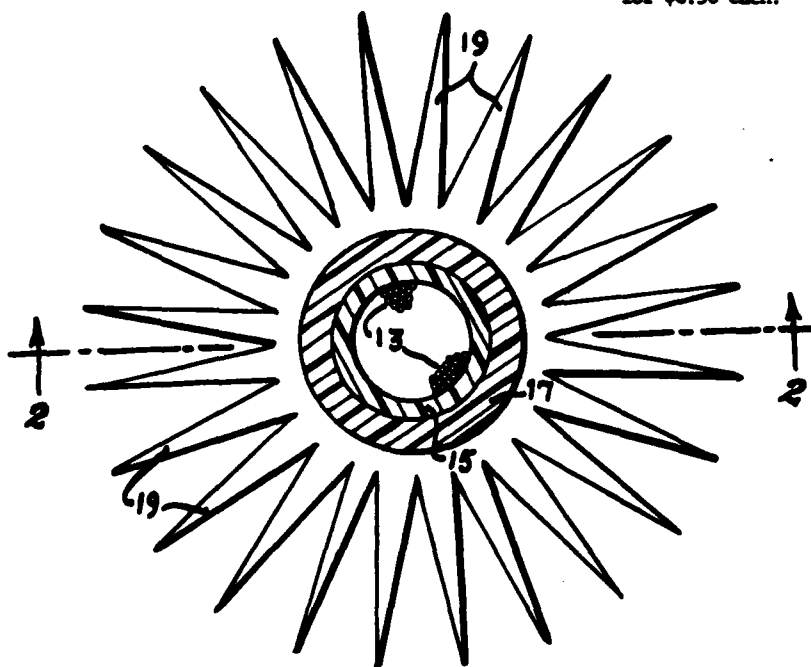
## [57] ABSTRACT

A protective sheath for use over a buried fibre optic cable wherein a plurality of spikes extend radially outward from an outer jacket which completely encircles and covers the fibre optic cable bundle which is surrounded by an inner jacket. The inner jacket, outer jacket and spikes are fabricated of a plastic composite material produced by polymerization which can be molded, extruded or cast into a suitable spiked shape. The cable is thereby protected from chewing or gnawing rodents that may be burrowing in the vicinity and would be discouraged from attacking the fibre optic cable even from underneath.

1 Claim, 2 Drawing Figures

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,309,901

Rolinski et al.

[45] Jan. 12, 1982

[54] HEAT TRANSFER CALIBRATION PLATE

[75] Inventors: Edmund J. Rolinski, Montgomery County, Ohio; Bernard Lamb, Santa Clara County, Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 104,925

[22] Filed: Dec. 18, 1979

[51] Int. Cl.<sup>3</sup> ..... G01K 17/04; G01M 9/00

[52] U.S. Cl. .... 73/147; 73/190 H;

[58] Field of Search ..... 73/147, 190 H, 15 A, 73/349, 357, 204

[56] References Cited

U.S. PATENT DOCUMENTS

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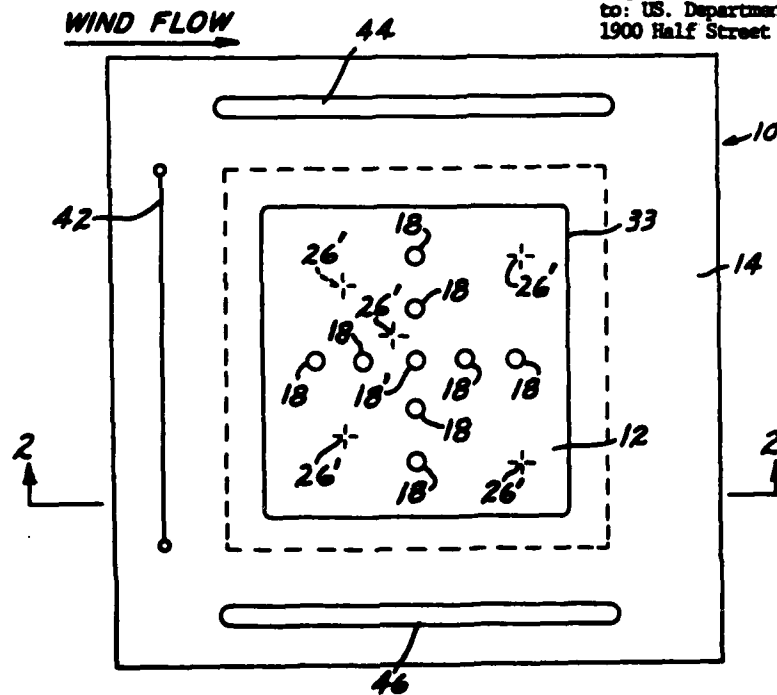
Primary Examiner—Daniel M. Yasich  
Attorney, Agent, or Firm—Donald J. Singer; Richard J. Killoren

[57] ABSTRACT

A heat transfer calibration plate for use in obtaining data for determining the heat transfer coefficient in a wind tunnel test system having a copper plate mounted in an aluminum support plate. Nine heat flux gages are positioned in a horizontal and a vertical row with a center gage common to the two rows. A heater is provided to heat the plate to the desired temperature. Thermocouples are provided to indicate plate temperature. Outputs of the thermocouples and heat flux gages are recorded on a recorder. All of the heat flux gages except the center gage are connected to the recorder through a rotary switch. Plenum temperature and pressure are also recorded.

1 Claim, 6 Drawing Figures

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,310,121

Basinski, Jr.

[45] Jan. 12, 1982

## [54] EXHAUST NOZZLE ACTUATION ASSEMBLY

[75] Inventor: Edward M. Basinski, Jr., Enfield, Conn.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 154,720

[22] Filed: May 30, 1980

[51] Int. Cl.<sup>3</sup> ..... B64C 15/04

[52] U.S. Cl. .... 239/265.33

[58] Field of Search ..... 239/265.19-265.41;  
60/228, 232, 233; 244/110 R, 110 B

## [56] References Cited

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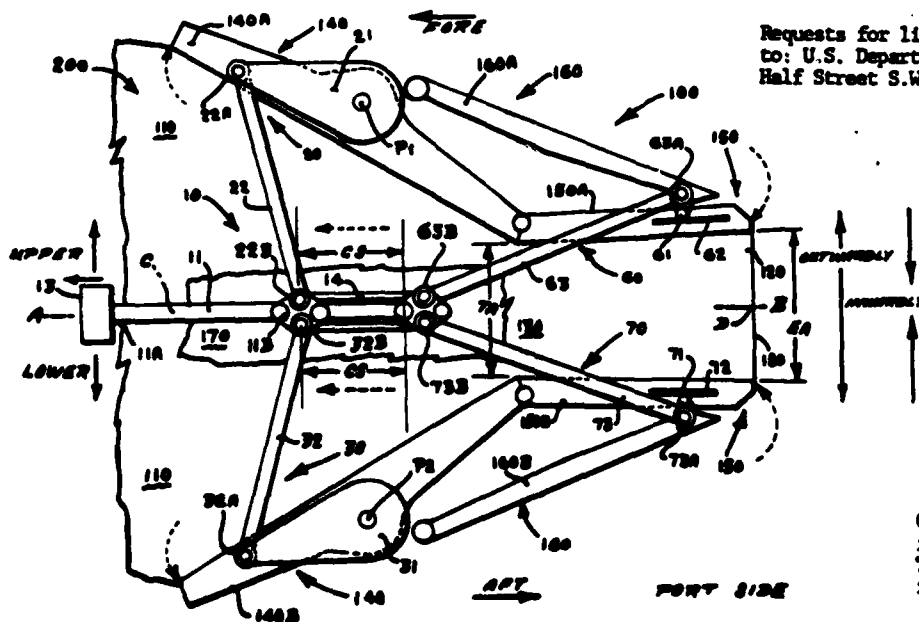
Primary Examiner—Robert B. Reeves  
Assistant Examiner—Gene A. Church  
Attorney, Agent, or Firm—Donald J. Singer; Arsen Tashjian

## [57] ABSTRACT

An actuation assembly for selectively varying the throat area of a convergent-divergent exhaust nozzle of a gas turbine engine and simultaneously achieving predetermined fixed ratios of throat area versus exit area. The assembly structurally comprises a plurality of constituent components (including a linear actuator member on the port side, and another on the starboard side, of the nozzle in parallel spaced-apart relationship with the centerline common to the engine and to the exhaust nozzle) that interact and cooperate to pivot the convergent flaps to reduce the throat area while simultaneously moving the divergent flaps inwardly, or to pivot the convergent flaps to increase the throat area while simultaneously moving the divergent flaps outwardly, as desired, thereby permitting the selective varying of the throat area while attaining a predetermined fixed ratio of the throat area to the exit area of the convergent-divergent exhaust nozzle. In addition, and unlike the prior art, the respective lengths of linear movements required to effectuate either the convergent flaps from a minimum throat area position to a maximum throat area position or the divergent flaps from a minimum exit area position to a maximum exit area position are equal, as are the respective lengths in the converse. Thusly, only a single actuator per side is required.

9 Claims, 2 Drawing Figures

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**United States Patent** [19]

[11] **4,310,215**

**Kelley**

[45] **Jan. 12, 1982**

**[54] STABLE ULTRAVIOLET CHEMICAL FILTER**

[75] **Inventor:** Lawrence R. Kelley, Redondo Beach, Calif.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 149,793

[22] **Filed:** May 14, 1980

[51] **Int. Cl.:** G02B 5/24

[52] **U.S. Cl.:** 350/1.5; 250/510

[58] **Field of Search:** 350/1.5, 312; 250/510

[56] **References Cited**

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*Photophysiology*, edited by Giese, A. C., vol. III, Chapter 1, pp. 1-32.

*Primary Examiner*—John K. Corbin

*Assistant Examiner*—Bruce Y. Arnold

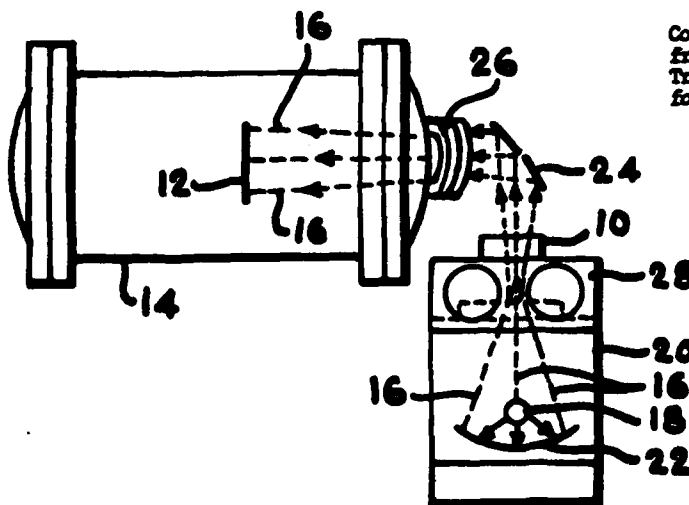
*Attorney, Agent, or Firm*—Donald J. Singer; William J. O'Brien

**[57] ABSTRACT**

A liquid chemical filter for suppressing the heat producing portion of the solar spectrum emanating from a simulated solar source and composed of a mixture of hydrochloric acid, cobalt sulfate and distilled water positioned between two ultraviolet transmitting fused silica windows.

**3 Claims, 5 Drawing Figures**

Requests for licensing information should be addressed to: U.S. Department of the Air Force AF/JACP 1900 Half Street S.W. Wash., DC 20324



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,310,242

Genco et al.

[45] Jan. 12, 1982

## [54] FIELD TEST UNIT FOR WINDSCREEN OPTICAL EVALUATION

[75] Inventors: Louis V. Genco, Enon; Harry L. Task, Montgomery County, both of Ohio

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 136,210

[22] Filed: Apr. 1, 1980

[51] Int. Cl.<sup>3</sup> ..... G01N 21/41

[52] U.S. Cl. .... 356/128; 356/239;  
356/365

[58] Field of Search ..... 356/32, 33, 365, 121,  
356/124, 124.5, 128, 239

## [56] References Cited

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lence by Narrow Laser Beams", Applied Optics, vol. 9, No. 11, (Nov. 1970), pp. 2543-2547.

Primary Examiner—R. A. Rosenberger  
Attorney, Agent, or Firm—Donald J. Singer; Casimer K. Salys

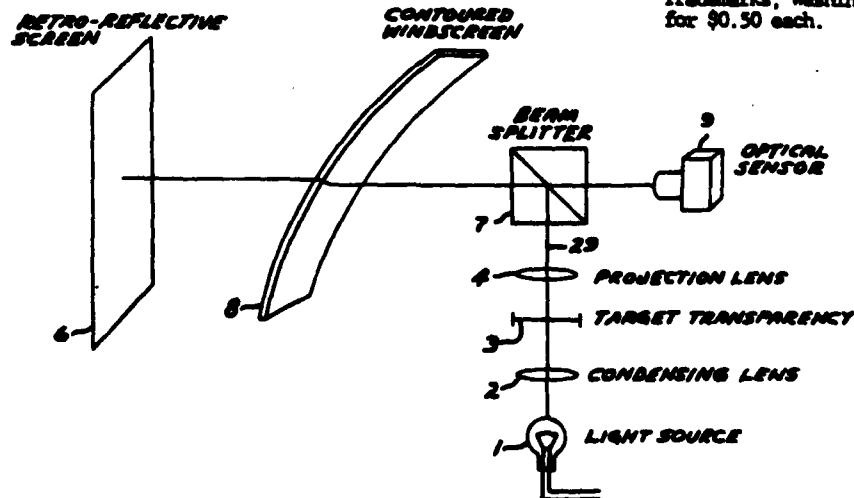
## [57] ABSTRACT

An apparatus for analyzing the deleterious characteristics of optically transparent bodies, including distortion, multiple imaging and birefringence. A beam of light is projected along an optical axis onto a beam splitter. The reflected segment passes through the transparent body and is then reflected back along nearly the same path toward the beam splitter by a retro-reflective screen lying at the image plane of the beam. The portion of the reflected beam passing directly through the beam splitter is detected by an optical sensor in substantial orientation with the axis of the beam reaching it. Distortions and multiple imaging are detected by shape changes and images, respectively, in a pattern of opaque areas superimposed on the originating beam. Birefringence is analyzed by polarizing the originating beam and observing the color pattern and intensity reaching the sensor.

6 Claims, 8 Drawing Figures

Requests for licensing information should be addressed to: U.S. Department of the Air Force AF/JACP 1900 Half Street S.W. Wash., DC 20324

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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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**United States Patent** [19]

[11] **4,312,625**

**Pinaire**

[45] **Jan. 26, 1982**

[54] **HYDROGEN COOLED TURBINE**

2,783,613 3/1957 Von Zborowski ..... 416/95  
3,297,301 1/1967 Petrie et al. .... 416/95  
3,358,457 12/1967 Caldwell et al. .... 60/39.66

[75] **Inventor:** Louis W. Pinaire, Prospect, Ky.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

## FOREIGN PATENT DOCUMENTS

742476 12/1955 United Kingdom ..... 416/96

[21] **Appl. No.:** 832,505

*Primary Examiner*—Stephen C. Bentley  
*Attorney, Agent, or Firm*—Donald J. Singer, Jacob N.  
Erlach

[22] **Filed:** Jan. 11, 1969

[51] **Int. Cl.:** ..... F01D 5/18

[52] **U.S. Cl.:** ..... 416/96 R; 415/178

[58] **Field of Search:** ..... 416/95 R, 96 R;  
60/39.66; 415/178

## [57] ABSTRACT

A bladed rotor for a turbine having a rotor disk and a plurality of blades. The blades contain a plurality of passages therein for circulating a hydrogen coolant in order to cool the blade. In order to prevent leakage of the hydrogen the blade is electron welded onto the rotor disk.

## [56] References Cited

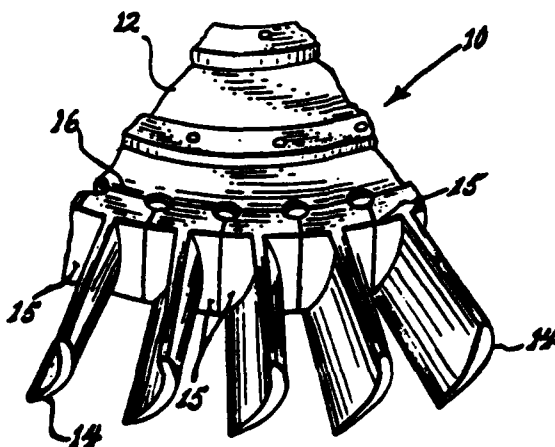
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2,635,805 4/1953 Baumann ..... 416/96  
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2,778,601 1/1957 Eckert ..... 416/96

7 Claims, 6 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,313,207**

**Nardozza et al.**

[45] **Jan. 26, 1982**

[54] **METHOD AND SYSTEM FOR SELECTIVELY  
DISRUPTING RADIO TELEGRAPH  
COMMUNICATIONS**

[75] **Inventors:** Vincent J. Nardozza, Rome; Marvin  
R. Clinch, Oncida, both of N.Y.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 616,423

[22] **Filed:** Feb. 18, 1967

[51] **Int. Cl.:** G01S 7/36

[52] **U.S. Cl.:** 455/1; 375/2.1;  
343/18 E

[58] **Field of Search:** 343/18 E; 325/21, 22;  
455/1, 18; 375/2, 4, 21, 22

[56] **References Cited**

## U.S. PATENT DOCUMENTS

2,440,253	4/1948	Dodington	343/18 E
2,703,881	3/1955	Bergemann et al.	343/18 E
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3,015,096	12/1961	Deloraine et al.	343/18 E
3,019,433	1/1962	White	343/18 E
3,983,482	9/1976	Doherty	455/18
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4,219,891	8/1980	Weiss et al.	455/1

**Primary Examiner**—Howard A. Birmiel

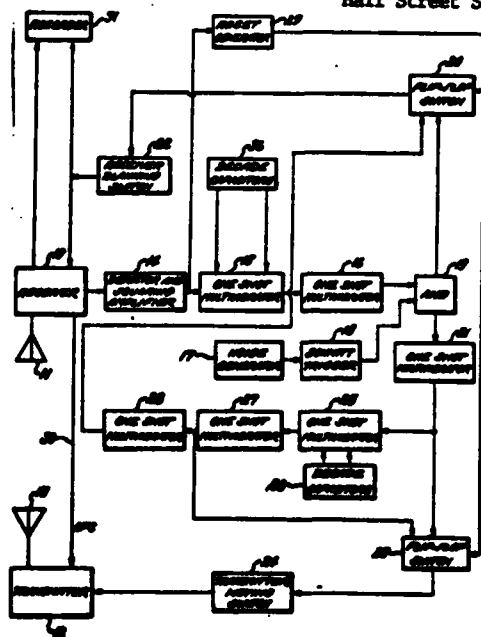
**Attorney, Agent, or Firm**—Donald J. Singer; Sherman H.  
Goldman

[57] **ABSTRACT**

A method and system for disrupting discrete keyed continuous wave radio communications wherein the discrete keyed continuous wave communications signal conveys intelligence by virtue of the duration and spacing of a coded series of characters by insertion of additional character representing signals within the spaces between the characters of the original signal, thereby changing the coded series and thus depriving the intended recipient of the original intelligence.

**5 Claims, 2 Drawing Figures**

Requests for licensing information should be addressed  
to: U.S. Department of the Air Force AF/JACP 1900  
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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,313,679

Wolff et al.

[45] Feb. 2, 1982

## [54] TEST SAMPLE SUPPORT ASSEMBLY

[75] Inventors: Ernest G. Wolff, Rolling Hills Estates; Steven A. Easlan, Long Beach, both of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 98,429

[22] Filed: Nov. 29, 1979

[51] Int. Cl. G01N 21/01; G01B 11/02;

G01N 25/16

[52] U.S. Cl. 356/244; 73/16;

219/10.67; 356/358

[58] Field of Search 356/244, 345, 357-358;

356/360, 35.5, 32; 350/253; 333/229, 234;

331/94.5 T, 94.5 S, 94.5 C; 357/80; 219/10.67;

73/766, 16

## [56] References Cited

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3,938,889 2/1976 McKinnis

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Bloss, R. L., "An Extensometer for Use as a Laboratory Standard at Temperatures to 1500° C.", ISA Trans., vol. 10, 1971, pp. 242-249.

Wolff et al., "Double Michelson Interferometer for Contactless Length Change Measurements", Samso-TR-78-136, 11-6-78.

Primary Examiner—William H. Punter

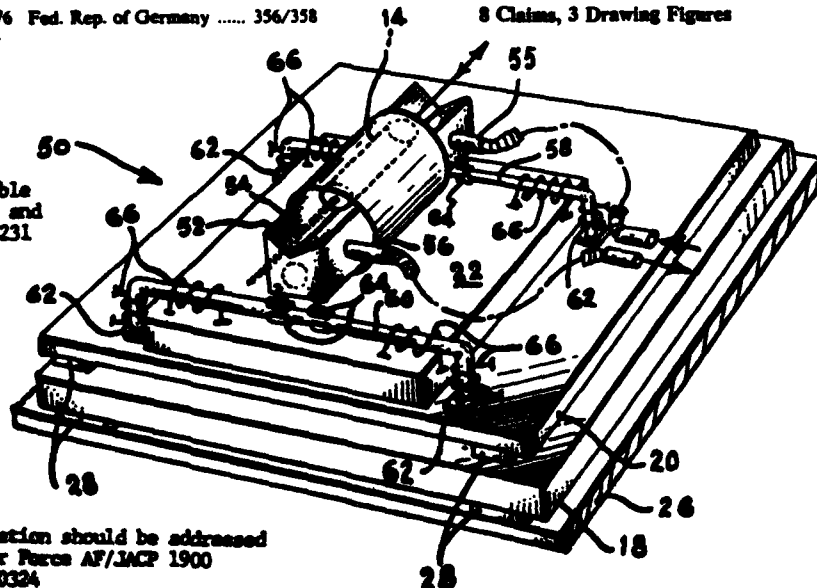
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

## [57]

### ABSTRACT

A test sample support assembly having its greatest utility in a length measuring device in a temperature controlled environment. The sample support assembly has a main support, a pair of insulating members and a sample support. In one embodiment of this invention the sample support is made of a substantially distortion-free material thereby precisely positioning the sample within the temperature controlled environment. In the other embodiment of this invention the sample support acts as the temperature controlling element. The sample support is adjustably mounted with respect to the main support. This adjustable feature permits corrective movement of the sample support to take place in order to compensate for the undesirable movement of the sample support.

8 Claims, 3 Drawing Figures



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,314,500

Hoppe

[45] Feb. 9, 1982

[54] INSTANTANEOUS OPENING POSITIVE  
LOCK MECHANISM

[75] Inventor: James C. Hoppe, Redondo Beach,  
Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 115,514

[22] Filed: Jan. 25, 1980

[51] Int. Cl.<sup>3</sup> ..... F42B 15/10

[52] U.S. Cl. .... 89/1 B; 102/378;  
188/67

[58] Field of Search ..... 188/67; 85/DIG. 1;  
89/1 B, 1.5 F; 102/49.4, 49.5; 285/2, 33

[56] References Cited

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3,265,408 8/1966 Dickie ..... 85/DIG. 1  
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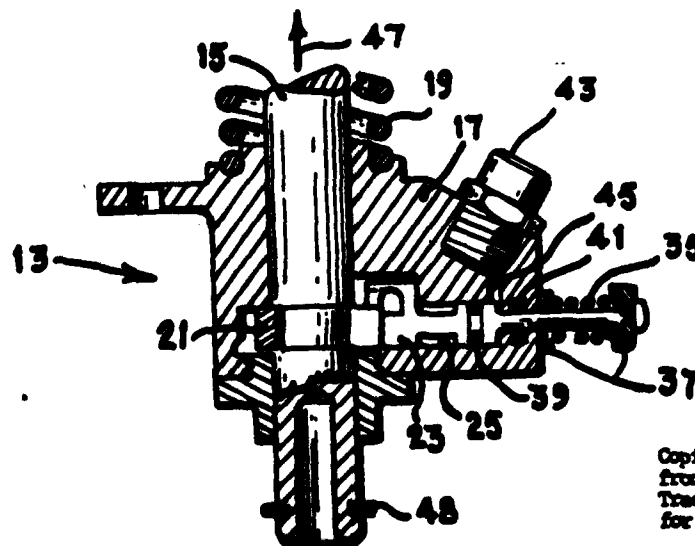
Primary Examiner—Ralph J. Hill  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N.  
Erich

[57] ABSTRACT

An actuating rod is locked firmly in position by a split spring locking ring which engages matching shoulders in a groove on the rod. An electrical signal operates to energize a squib gas generator which produces pressure forcing a piston inward unlocking the ring and engaging wedge faces on the split locking ring causing the ring to spread open and release the actuating rod which moves upward in response to the forces of an extension spring. When locked, the rod has great resistance to imposed axial and side loads.

1 Claim, 5 Drawing Figures

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,314,762

Gresko

[45] Feb. 9, 1982

[54] **FOCUSED, SINGLE STRAND, OPTICAL  
FIBER ROTATIONAL ALIGNMENT  
IMAGE-SENSING AND COMPARING  
SYSTEM**

[75] Inventor: Laurence S. Gresko, Long Beach,  
Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 154,718

[22] Filed: May 30, 1980

[51] Int. Cl.<sup>3</sup> ..... G01B 11/26

[52] U.S. Cl. .... 356/150; 350/15;  
350/96.10

[58] Field of Search ..... 350/96.15, 96.31;  
356/150, 399, 400, 375, 376

[56] References Cited

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3,207,904	9/1965	Heinz	356/150
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3,801,181	4/1974	Kitano et al.	350/96.31
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Uchida et al. "Optical Characteristics of a Light-Focusing  
Fiber Guide and Its Applications," IEEE Journal of

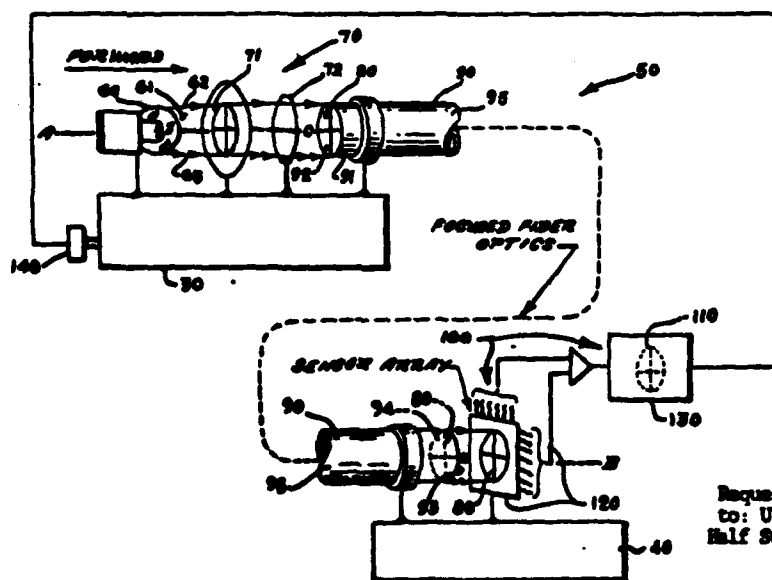
Quantum Electronics, vol. QE-6, No. 10, (Oct. 1970,  
pp. 606-612).

Primary Examiner—R. A. Rosenberger  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N.  
Erlich

## [57] ABSTRACT

This system permits the detection of rotational mis-  
alignment (i.e., twist) of two initially aligned, but sepa-  
rated, members. The two aligned members are linked by  
a single strand of focused optical fiber which, in combi-  
nation with other co-acting components of the system,  
allows the user to detect rotational mis-alignment (i.e.,  
twist) of the members, based upon the phenomenon that  
a single strand of focused optical fiber is functionally  
capable of conveying a formed, completed, and real  
image from one end of the fiber to the other end. Ac-  
cordingly, one end of the fiber is attached to one mem-  
ber where an image is formed, and that formed image is  
transmitted to the other end which is attached to the  
other member where the transmitted image is sensed  
and compared to what the image should be if the mem-  
bers are still rotationally aligned. If the image that is  
received at the other end is positionally different (i.e.,  
twisted), then the members are rotationally mis-aligned.

4 Claims, 3 Drawing Figures



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,315,224

Ezekiel et al.

[45] Feb. 9, 1982

[54] LASER STIMULATED RAMAN  
MOLECULAR BEAM TIME AND  
FREQUENCY STANDARD

[75] Inventors: Shaoul Ezekiel, Lexington; Clare C. Leiby; Richard H. Picard, both of Bedford; Charles R. Willis, Newton, all of Mass.; Richard P. Hackel, Livermore, Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 150,523

[22] Filed: May 16, 1980

[51] Int. Cl.<sup>3</sup> ..... H03L 7/26

[52] U.S. Cl. .... 331/3; 372/3

[58] Field of Search ..... 331/3, 94; 250/201

[56] References Cited

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Hackel et al., "Physical Rev. Lett.", 25 June 1979, pp. 1736-1739.

Primary Examiner—David C. Nelms

Assistant Examiner—Darwin R. Hostetter

Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

[57]

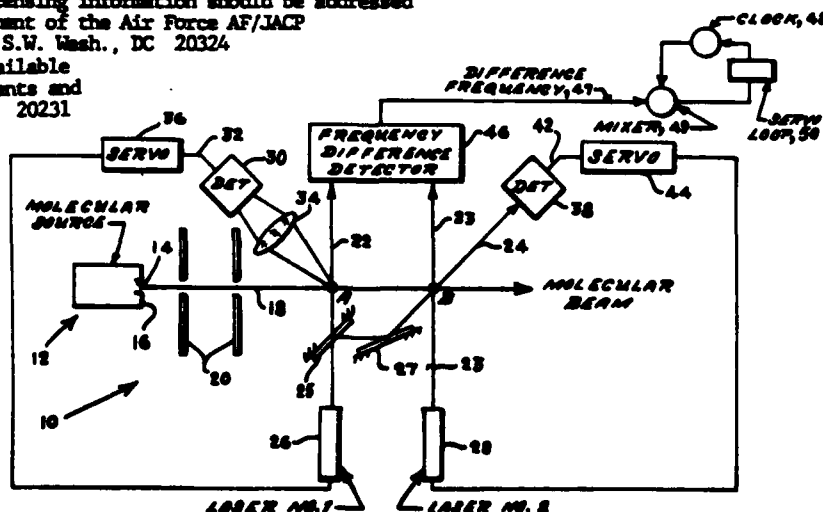
## ABSTRACT

A laser stimulated Raman molecular beam time and frequency standard utilizing a first electromagnetic beam at a first preselected frequency to pump a molecular beam at a first preselected point along the beam to state select the beam. A second electromagnetic beam (produced from either a different electromagnetic source than utilized to produce the first beam or produced from a portion of the first beam) at a second preselected frequency and a third electromagnetic beam at the first frequency simultaneously pump the molecules of the state selected molecular beam at a second point along the beam in a stimulated Raman process. By locking the frequency difference of the first and second electromagnetic beams to a specific resonant frequency, a time and frequency standard can be produced.

9 Claims, 3 Drawing Figures

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,318,060

Davis

[45] Mar. 2, 1982

[54] OPTICALLY PUMPED ATOMIC IODINE LASER

[75] Inventor: Steven J. Davis, Albuquerque, N. Mex.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 35,136

[22] Filed: May 1, 1979

[51] Int. Cl.<sup>3</sup> ..... H01S 3/00

[52] U.S. Cl. .... 372/70; 372/55

[58] Field of Search ..... 331/94.5 G, 94.5 CP

[56] References Cited

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"Quantum Efficiencies for the Production of Electronically Excited Iodine Atoms I( $5p^2P$ ) Following Laser Photolysis of  $I_2$  Near 5000Å", by Burde et al., *Physical Review A*, vol. 10, No. 6, Dec. 1974.

Primary Examiner—William L. Sikes

Assistant Examiner—Léon Scott, Jr.

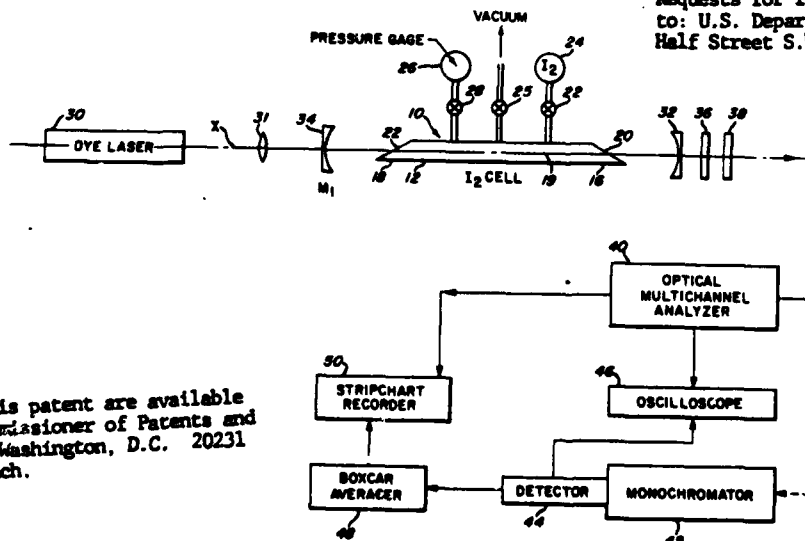
Attorney, Agent, or Firm—Donald J. Singer; Thomas L. Kundert

## [57] ABSTRACT

An optically pumped atomic iodine laser with a lasing cavity formed by a sealed cell containing iodine vapor as the lasing medium. A tunable dye laser having an output wavelength in the 493-501 nm range is oriented so that its beam is directed into the lasing cavity. This pumps the iodine vapor and results in its dissociation into an atomic iodine medium that lases at 1.315 microns. An optical cavity is formed by two mirrors mounted around the sealed cell on the optical axis of the lasing cavity in a substantially confocal configuration. The two mirrors are more than 99.9% reflective of radiation emitted by the lasing iodine vapor, but pass more than 80% of the radiation from the dye laser. A total reflector to radiation from the dye laser is positioned outside the optical cavity to reflect radiation from the dye laser back through the lasing cavity. Mode matching lenses are mounted between the dye laser and the sealed cell to shape the dye laser beam to the approximate mode shape of the lasing cavity. The iodine laser output beam is passed through a long pass filter to remove any remaining dye laser beam. This laser is capable of indefinite use without replenishment of the lasing medium and the wavelength of its output beam is independent of the wavelength of the pumping beam from the dye laser.

5 Claims, 3 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]  
**Przyjemski**

[11] **4,318,063**  
[45] **Mar. 2, 1982**

[54] **CRYSTAL OSCILLATOR COMPENSATED  
FOR G-SENSITIVITY**

[75] **Inventor:** Joseph M. Przyjemski, Carlisle,  
Mass.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 35,578

[22] **Filed:** May 3, 1979

[51] **Int. Cl.:** H03B 5/32

[52] **U.S. Cl.:** 331/158; 331/116 R

[58] **Field of Search:** 331/158, 116 R, 116 FE,  
331/175; 361/278, 280

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

4,100,512 7/1978 Valdois ..... 331/158

**Primary Examiner**—David K. Moore

**Attorney, Agent, or Firm**—Donald J. Singer; Willard R.  
Matthews, Jr.

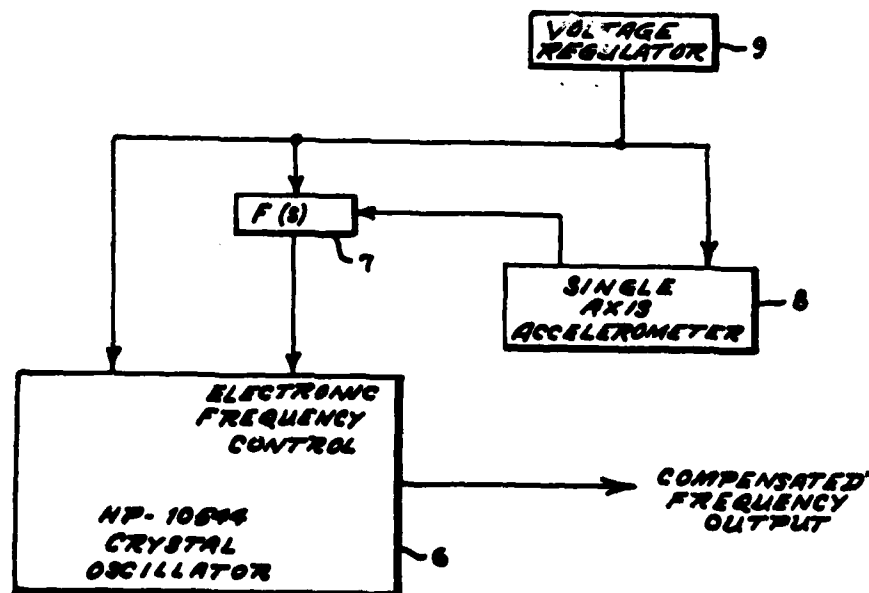
[57] **ABSTRACT**

A crystal reference oscillator with improved g-sensitivity is realized through the use of an appropriately oriented single axis accelerometer. Components of acceleration normal to the plane of zero g-sensitivity of the oscillator are sensed by the accelerometer which returns a correction voltage to the electronic frequency control input of the oscillator. A model is developed that permits determination of accelerometer position relative to the oscillator without prior knowledge of crystal orientation.

**1 Claim, 5 Drawing Figures**

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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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United States Patent [19]

[11] 4,318,102

Poirier

[45] Mar. 2, 1982

[54] INTRUSION DETECTION SYSTEM HAVING  
LOOK-UP SENSOR INSTRUMENTATION  
FOR INTRUSION RANGE AND ALTITUDE  
MEASUREMENTS

[75] Inventor: Joseph L. Poirier, Chelmsford, Mass.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 140,551

[22] Filed: Apr. 15, 1980

[51] Int. Cl.<sup>3</sup> ..... G01S 13/08

[52] U.S. Cl. .... 343/12 A; 340/552;  
343/5 PD

[58] Field of Search ..... 343/5 PD, 12 A;  
340/552

[56] References Cited

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4,187,501 2/1980 Olesch et al. .... 343/5 PD X

Primary Examiner—T. H. Tubbesing

Attorney, Agent, or Firm—Donald J. Singer; Willard R.  
Matthews

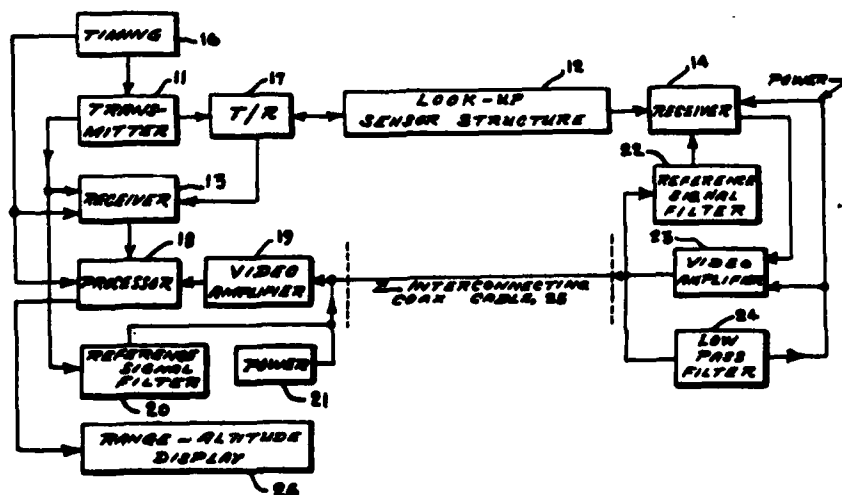
[57] ABSTRACT

Range and elevation measurement ambiguities in upward looking intruder detection systems are eliminated by look-up sensor instrumentation that utilizes monostatic and bistatic radar principles. Intruder detection systems that have the capability of monitoring the air space over the perimeter of an area to be protected and that employ radar ranging techniques and guided wave sensor generate only limited or ambiguous intrusion event information. That is, the r.f. signals that are transmitted and received travel from the transmitter-receiver-processor location through the sensor, up to the intrusion and back through the same path. The data developed is thus the same for high altitude close range intrusions as it is for low altitude distant intrusions. This ambiguity is eliminated by utilizing a transmitter and receiver at one end of the upward looking sensor and a second receiver at the other end. The transmitter and its associated receiver comprises a monostatic radar and the transmitter and the other receiver comprises a bistatic radar. The conventional monostatic radar measures total distance from the transmitter to an intrusion. The bistatic radar measures intrusion altitude only. The two radar outputs are differenced by a processor to determine range.

5 Claims, 5 Drawing Figures

Requests for licensing information should be addressed  
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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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**United States Patent** [19]

[11] **4,318,137**

**Cordova et al.**

[45] **Mar. 2, 1982**

**[54] REAL TIME DIGITAL RECORDING SYSTEM  
FOR THERMOVISION DATA**

**[75] Inventors:** Ronald J. Cordova, Nashua, N.H.;  
Edmund J. Peters, Bedford; James S.  
Martin, Brighton, both of Mass.

**[73] Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

**[21] Appl. No.:** 900,948

**[22] Filed:** Apr. 28, 1978

**[51] Int. Cl.:** G11B 5/00

**[52] U.S. Cl.:** 360/32; 360/8;  
360/9

**[58] Field of Search:** 360/32, 39, 51, 9, 8

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

3,919,716 11/1975 Yumde et al. 360/9  
4,016,361 4/1977 Pandey 358/127  
4,057,836 11/1977 Munsey 358/140  
4,058,835 11/1977 Kennedy 360/9

**Primary Examiner**—Vincent P. Canney  
**Attorney, Agent, or Firm**—Donald J. Singer; Willard R.  
Matthews, Jr.

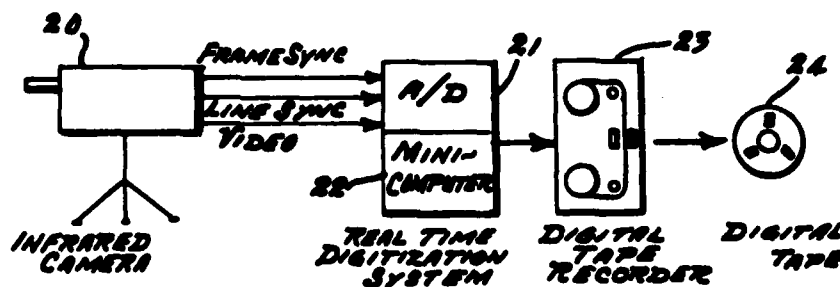
**[57] ABSTRACT**

Direct, real time digital data recording of thermal imagery is realized by the utilization of a computer that receives and stores bursts of high speed data from the digitized analog output of an infrared camera and simultaneously transfers a uniform flow of the data at a lower data rate to a digital tape recorder. The computer receives data only during camera active scan periods but transfers data to the recorder continuously. By making the computer output data rate substantially equal to the average input data rate real time recording is achieved. Full utilization of the data handling capacities of both the computer and the lower speed recorder is accomplished by digitizing the camera output signals in 8 bit words, combining pairs of 8 bit words for 16 bit word processing in the computer and reconvertng the computer output data to 8 bit words for recording by the digital tape recorder.

**4 Claims, 10 Drawing Figures**

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,318,669**

**Weenerstrom**

[45] **Mar. 9, 1982**

[54] **VANE CONFIGURATION FOR FLUID WAKE  
RE-ENERGIZATION**

3,935,704 2/1976 Barnes ..... 60/226 R  
4,089,618 5/1978 Patel ..... 416/228

[75] **Inventor:** Arthur J. Weenerstrom,  
Montgomery County, Ohio

## FOREIGN PATENT DOCUMENTS

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

719758 2/1932 France ..... 415/119  
2403474 9/1977 France ..... 415/119  
14668 of 1912 United Kingdom ..... 415/DIG. 1

[21] **Appl. No.:** 110,146

**Primary Examiner**—Robert E. Garrett  
**Attorney, Agent, or Firm**—Donald J. Singer; Richard J.  
Killoren

[22] **Filed:** Jan. 7, 1980

## [57] ABSTRACT

[51] **Int. Cl.** ..... F01D 9/00

[52] **U.S. Cl.** ..... 415/119; 415/216;  
60/751

[58] **Field of Search** ..... 416/228, 235; 415/209,  
415/210, 211, 212 R, 216, 119, DIG. 1, 208;  
60/751, 39.36, 39.37; 138/37

An airfoil for use in an axial flow compressor, a high-bypass turbofan or as a turning vane in an airflow duct having a crenelated trailing edge. The crenelated trailing edge produces pairs of counterrotating vortices which promote rapid mixing between the low momentum fluid, in the wake of the airfoil, and the adjacent fluid streams. The mixing of the adjacent streams with the low momentum wake acts to re-energize the wake.

[56] **References Cited**

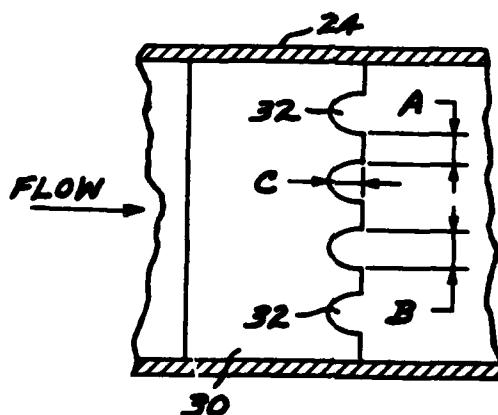
## U.S. PATENT DOCUMENTS

2,540,526 2/1951 Howell ..... 60/39.37

**4 Claims, 8 Drawing Figures**

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# PATENT ABSTRACT

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**United States Patent** [11]  
**Schultz**

[11] **4,319,723**  
[45] **Mar. 16, 1982**

[54] **STABILIZER FOR AN EJECTION SEAT**

[75] Inventor: **Edwin R. Schultz, Waynesville, Ohio**

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **111,044**

[22] Filed: **Jan. 10, 1980**

[51] Int. Cl.<sup>3</sup> ..... **B64D 25/10**

[52] U.S. Cl. .... **244/122 A; 244/141**

[58] Field of Search ..... **244/122 R, 122 A, 122 AB, 244/122 AC, 122 AD, 122 AE, 122 AH, 141, 140, 82**

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

1,087,993 2/1914 Sprater ..... 244/82  
2,829,850 4/1958 Culver ..... 244/141  
2,931,598 4/1960 Sanctuary ..... 244/122 AD

3,042,347 7/1962 Halsey ..... 244/141

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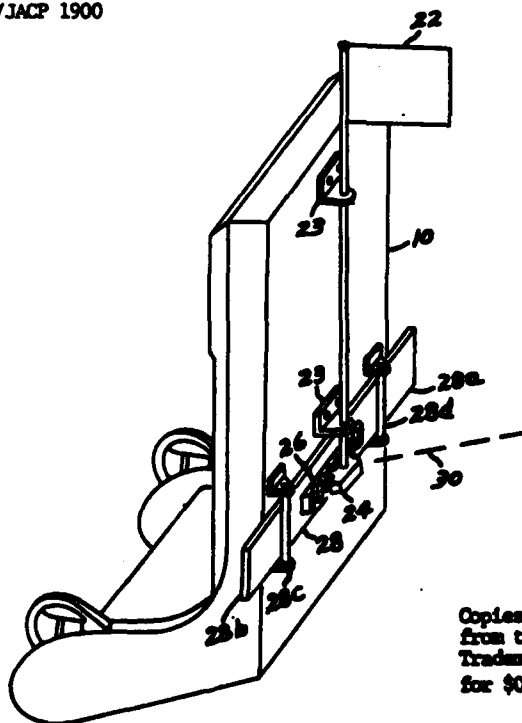
*Primary Examiner*—Charles E. Frankfort  
*Attorney, Agent, or Firm*—Donald J. Singer; Richard J. Killoren

[57] **ABSTRACT**

A yaw stabilization system for an aircraft ejection seat having a vane for sensing the angular offset of the yaw air flow velocity vector and for extending paddles into the air stream in response to the velocity vector offset. The extended paddle is acted upon by the air stream to provide a restoring moment around the center of gravity of the seat and occupant to return the seat to the desired attitude with respect to the air flow velocity vector.

**4 Claims, 5 Drawing Figures**

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,319,809

Abel

[45] Mar. 16, 1982

[54] SYMMETRICAL 1:1 PHOTOGRAPHIC  
OBJECTIVE LENS

[75] Inventor: Irving R. Abel, Lexington, Mass.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 140,529

[22] Filed: Apr. 15, 1980

[51] Int. Cl. G02B 9/62

[52] U.S. Cl. 350/464

[58] Field of Search 350/464

[56] References Cited

## U.S. PATENT DOCUMENTS

2,734,424 2/1956 Bertele ..... 350/464  
3,700,312 10/1972 Bertele ..... 350/464  
3,865,471 2/1975 McCrobie ..... 350/464

3,871,749 3/1975 Harada ..... 350/464  
4,013,349 3/1977 Bertele et al. .... 350/464 X

Primary Examiner—John K. Corbin  
Assistant Examiner—Scott J. Sugarman  
Attorney, Agent, or Firm—Donald J. Singer; Arsen  
Tashjian

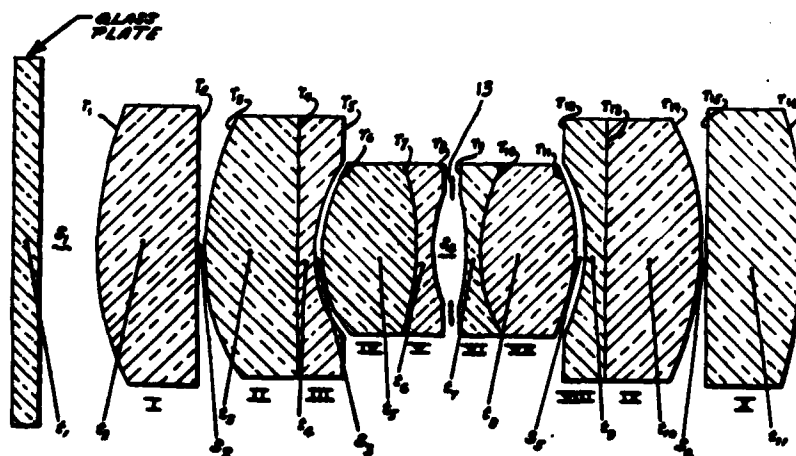
## [57] ABSTRACT

An objective lens system of the Double Gauss type wherein negative lens elements are symmetrically disposed on both sides adjacent the stop, each negative element being a cemented doublet comprising a double convex negative and a positive lens element. A cemented doublet positive lens component is next positioned at the outside of each of the negative elements and a single positive lens is positioned at the outside of each of the inner positive lens components.

1 Claim, 1 Drawing Figure

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## United States Patent [19]

Durran

[11] 4,319,839

[45] Mar. 16, 1982

### [54] BEAM ALIGNMENT SYSTEM

[75] Inventor: Donald A. Durran, Manhattan Beach, Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 134,997

[22] Filed: Mar. 27, 1980

[51] Int. Cl.: G01B 11/27

[52] U.S. Cl.: 356/153; 350/6.5; 356/400

[58] Field of Search: 356/138, 153, 152, 147-148, 356/399-400; 219/121 LS, 121 LU, 121 LW, 121 LM; 346/76 L; 250/202-203; 358/285, 293; 350/6.1-6.91, 171

### [56] References Cited

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3,510,658	5/1970	Rabedau	250/202
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3,851,974	12/1974	Ravussin et al.	356/153
3,892,488	7/1975	Edmonds	356/153
3,902,036	8/1975	Zaleckas	219/121 LS
3,942,894	3/1976	Maier	356/153

4,146,329 3/1979 Fing et al. 356/152

Primary Examiner—William H. Punter  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N. Erlich

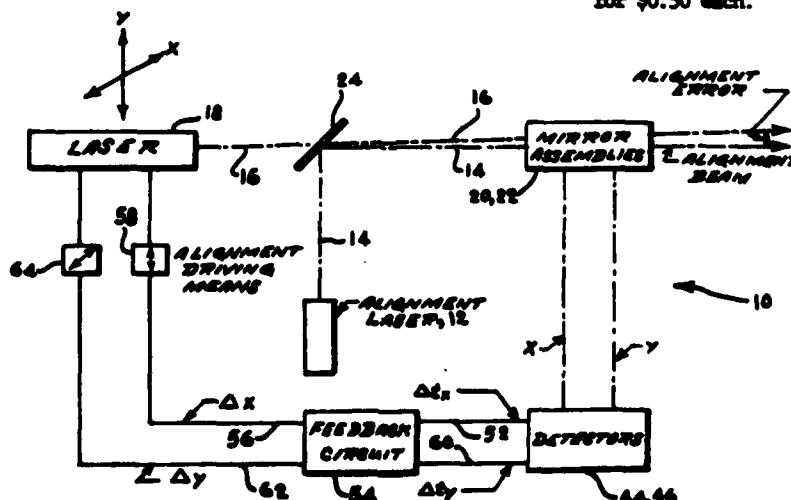
### [57] ABSTRACT

A beam alignment system having a source for producing a first beam of electromagnetic radiation considered an alignment or reference beam, a source for producing a second beam of electromagnetic radiation to be aligned with the first beam and pair of rotating mirrors capable of being optically interposed at different times across the optical path of the first and second beams. The axes of rotation of the pair of mirrors are transverse to each other in order to enable each mirror to provide alignment information about the beams with respect to two different planes. The alignment information is indicative of a time difference between the reception by a first detector of the reflected first beam and the reflected second beam from the first mirror and a time difference between the reception by a second detector of the reflected first beam and the reflected second beam from the second mirror. These time differences are utilized to provide signals which are used to adjust the position of the source for the second beam in order to bring the second beam into alignment with the first beam in two different planes.

6 Claims, 3 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]  
**Healey, III**

[11] **4,320,346**  
[45] **Mar. 16, 1982**

[54] **LARGE DYNAMIC RANGE LOW  
DISTORTION AMPLITUDE MODULATION  
DETECTOR APPARATUS**

[75] **Inventor:** Daniel J. Healey, III, Baltimore, Md.  
[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 132,452

[22] **Filed:** Mar. 21, 1980

[51] **Int. Cl.:** H03D 1/10

[52] **U.S. Cl.:** 329/101; 329/204;  
329/206; 455/337

[58] **Field of Search:** 329/101, 203, 204, 205 R,  
329/206; 455/337

[56] **References Cited**

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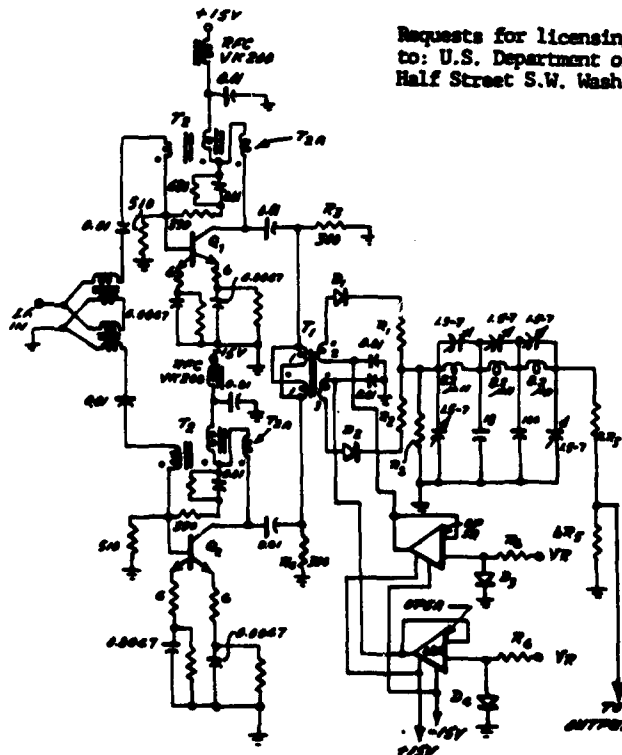
Equizabal, "Biasing the Diode Improves a-m Detector  
Performance", Electronics, Aug. 4, 1977, pp. 97, 99.

**Primary Examiner**—Siegfried H. Grimm  
**Attorney, Agent, or Firm**—Donald J. Singer; William  
Stepanishen

[57] **ABSTRACT**

An amplitude modulation detection apparatus utilizing  
a balanced diode rectifier circuit to detect amplitude  
modulation on HF and VHF amplitude modulated car-  
rier frequencies at rates approaching to the carrier fre-  
quency without diagonal clipping. A temperature com-  
pensating forward biasing supply circuit is connected to  
the rectifier circuit to supply thereto a forward bias  
potential that varies with temperature and a trickle  
current that remains substantially independent of tem-  
perature variation.

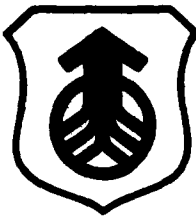
4 Claims, 3 Drawing Figures



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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,320,356**

**Perdue**

[45] **Mar. 16, 1982**

[54] **HIGH SPEED FREQUENCY ACQUISITION  
APPARATUS FOR MICROWAVE  
SYNTHESIZERS**

[75] **Inventor:** Edward M. Perdue, Framingham,  
Mass.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 123,335

[22] **Filed:** Feb. 21, 1980

[51] **Int. Cl.:** ..... H03L 7/16

[52] **U.S. Cl.:** ..... 331/11; 328/133;  
331/17; 331/25

[58] **Field of Search** ..... 331/1 A, 10, 11, 12,  
331/16, 17, 18, 25, 27; 328/133, 134, 155

[56]

**References Cited**

**U.S. PATENT DOCUMENTS**

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*Primary Examiner*—Siegfried H. Grimm  
*Attorney, Agent, or Firm*—Donald J. Singer; William  
Stepanishen

[57]

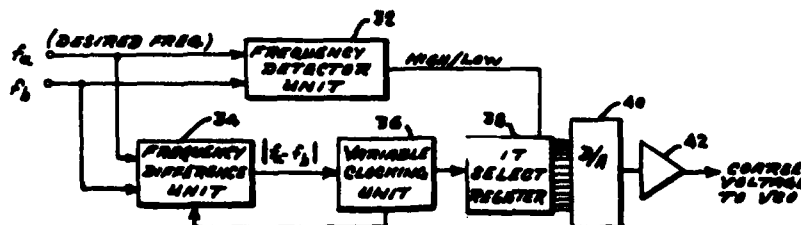
**ABSTRACT**

A high speed frequency acquisition apparatus utilizes a variable rate clocking circuit to establish the response time of the frequency comparator which compares the desired frequency with a reference frequency. The clocking circuit rate is determined by the inverse of the frequency difference between the two frequency signals.

**5 Claims, 3 Drawing Figures**

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**United States Patent** [19]

[11] **4,320,359**

**Peterson et al.**

[45] **Mar. 16, 1982**

**[54] OPTICAL BEAM MODE CONTROLLED LASER SYSTEM**

**[75] Inventors:** Phillip R. Peterson; Athanasios Gavrielides; John H. Erkkila, all of Albuquerque, N. Mex.

**[73] Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

**[21] Appl. No.:** 52,162

**[22] Filed:** Jan. 26, 1979

**[51] Int. Cl.:** H01S 3/096

**[52] U.S. Cl.:** 372/18; 372/19; 372/94

**[58] Field of Search:** 331/94.5 UL, 94.5 N, 331/94.5 M, 94.5 C, 94.5 G

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

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"An Independently Controllable Multiline Laser Resonator and Its Use in Multifrequency Injection Locking", by Sheffield et al., *Appl. Phys. Lett.*, vol. 29, No. 9, Nov. 1976.

**Primary Examiner**—William L. Sikes

**Assistant Examiner**—Leon Scott, Jr.

**Attorney, Agent, or Firm**—Donald J. Singer; Jacob N. Erlich

**[57]**

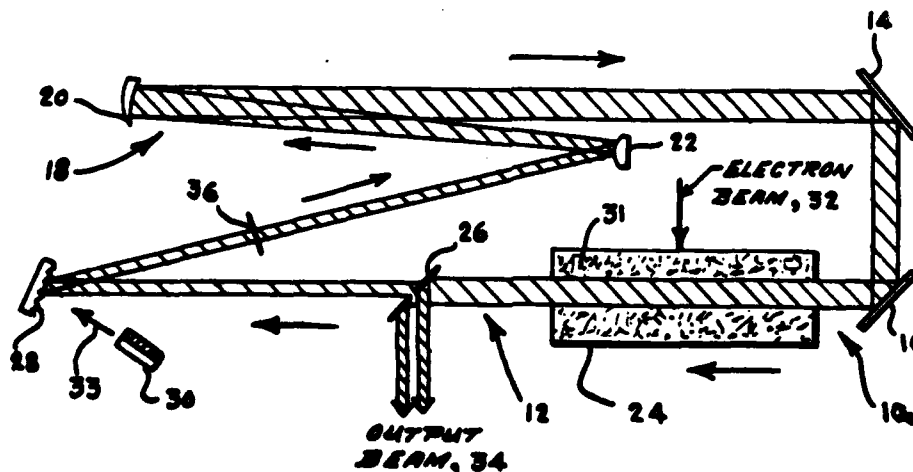
**ABSTRACT**

An optical beam mode controlled high power laser system having a resonator which incorporates therein as one of the reflective elements a high efficiency diffraction grating. Impinging upon the diffraction grating is not only the high power resonator laser beam, but also an injected mode controlling laser beam of preselected wavelength. Each beam is directed at the diffraction grating at a predetermined angle in order for the grating to direct away therefrom a combined beam of radiant energy having high power and being locked to the preselected wavelength of the injected laser beam. It is this high power laser beam of preselected wavelength which is output from the laser system.

**7 Claims, 4 Drawing Figures**

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# PATENT ABSTRACT

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## United States Patent [19]

Toy et al.

[11] 4,321,359

[45] Mar. 23, 1982

### [54] PERFLUOROCOMPOUNDS

[75] Inventors: Madeline S. Toy, Palo Alto; Roger S. Stringham, Woodside, both of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 182,562

[22] Filed: Aug. 29, 1980

[51] Int. Cl. .... C08G 61/02

[52] U.S. Cl. .... 528/397; 568/634;  
568/665

[58] Field of Search .... 528/397; 568/634, 665

### [56] References Cited

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Toy et al., J. of Polymer Science: Polymer Chemistry Edition, 16 2781-2795 (1978) Discloses Perfluorocarbocyclic Ethers and Polyethers from Hexafluorobenzene.

Toy et al., J. of Fluorine Chemistry, 13 (1979), 463-464, Discloses Thermal Isomization of a Perfluorobicyclo [2.2.0] Hexene Derivative.

Primary Examiner—Wilbert J. Briggs, Sr.

Attorney, Agent, or Firm—Donald J. Singer; William J. O'Brien

### [57]

### ABSTRACT

A method for polymerizing octafluoronaphthalene and the resulting perfluorocompounds prepared therefrom. Polymerization is accomplished by reacting the octafluoronaphthalene monomer with a mono or difluoropolyperfluoroalkane.

4 Claims, No Drawings

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United States Patent [19]

[11] 4,323,310

Shaw et al.

[45] Apr. 6, 1982

## [54] FIBER OPTIC ROTATION SENSING INTERFEROMETER

[75] Inventors: Herbert J. Shaw; Marvin Chodorow,  
both of Stanford, Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 100,320

[22] Filed: Dec. 5, 1979

[51] Int. Cl.<sup>3</sup> ..... G01B 9/02

[52] U.S. Cl. .... 356/350

[58] Field of Search ..... 356/350

### [56] References Cited

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4,133,612 1/1979 Redman ..... 356/350

#### OTHER PUBLICATIONS

Arditty, H. et al, "Re-Entrant Fiberoptic Approach to  
Rotation Sensing", Spie, vol. 157, p. 138, 12/78.

Primary Examiner—William H. Punter  
Attorney, Agent, or Firm—Donald J. Singer; Jacob N.  
Erlach

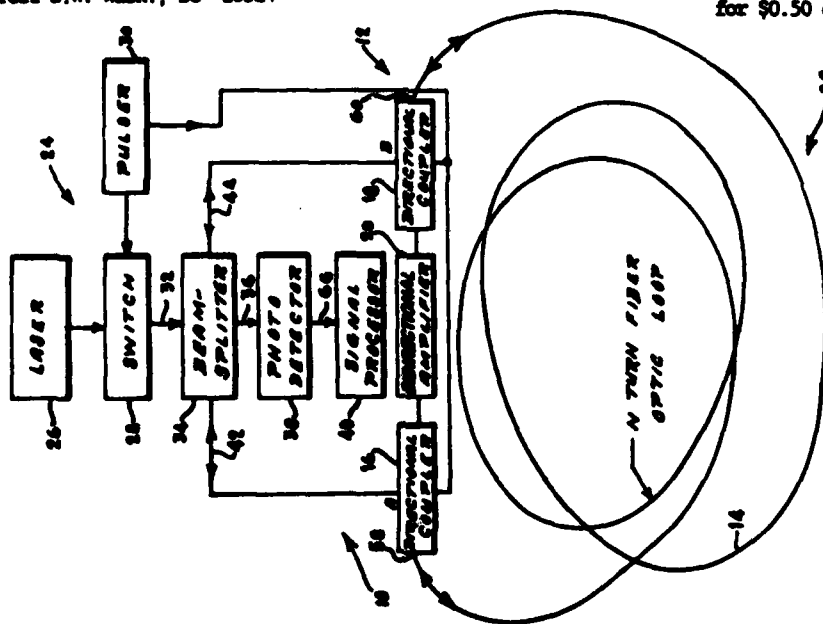
Requests for licensing information should be addressed  
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Half Street S.W. Wash., DC 20324

### [57] ABSTRACT

A fiber optic rotation sensing interferometer based on the Sagnac effect in which mechanical rotation introduces measurable shifts in the phase of optical signals transversing a closed path. The interferometer includes the closed optical path made up of a multi-turn fiber optic loop, a directional coupler or couplers, and an amplifier. A pulse of electromagnetic radiation is fed into the optical path by means of a pulsed electromagnetic source such as a laser and a beam splitter. The beam splitter splits the pulse into two pulses which undergo multiple circulations about the optical path in opposite directions. The directional couplers non-destructively sample the two pulses after each pass therethrough and send the pair of pulse samples to the beam splitter once each circulation. The beam splitter sends these pulse pair samples to a detector and signal processor once each circulation. The detector measures the instantaneous relative phase shift between the two pulse samples in each of the multiple pulse pairs and outputs phase information once each circulation. This phase information is converted by the signal processor into the angle of rotation or into rotation rate of the interferometer.

10 Claims, 4 Drawing Figures

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JAT 00390



# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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United States Patent [19]

[11] 4,323,798

Watkins

[45] Apr. 6, 1982

[54] FAST OPERATING SWITCHABLE  
OPERATIONAL AMPLIFIER DRIVEN  
CIRCUITS

3,919,658 11/1975 Friend ..... 330/107  
4,210,873 7/1980 Suzuki et al. .... 330/107  
4,220,875 9/1980 Lawton ..... 307/493

[75] Inventor: Grant H. Watkins, Upper Marlboro, Md.

Primary Examiner—Harold A. Dixon  
Attorney, Agent, or Firm—Donald J. Singer; Willard R. Mathews, Jr.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

## [57] ABSTRACT

[21] Appl. No.: 141,501

[22] Filed: Apr. 18, 1980

[51] Int. Cl.<sup>3</sup> ..... H03B 1/03; H03F 1/36

[52] U.S. Cl. .... 307/491; 328/167;

307/353; 330/107

[58] Field of Search ..... 307/493, 491, 353;

328/167; 330/107, 109, 291

[56] References Cited

### U.S. PATENT DOCUMENTS

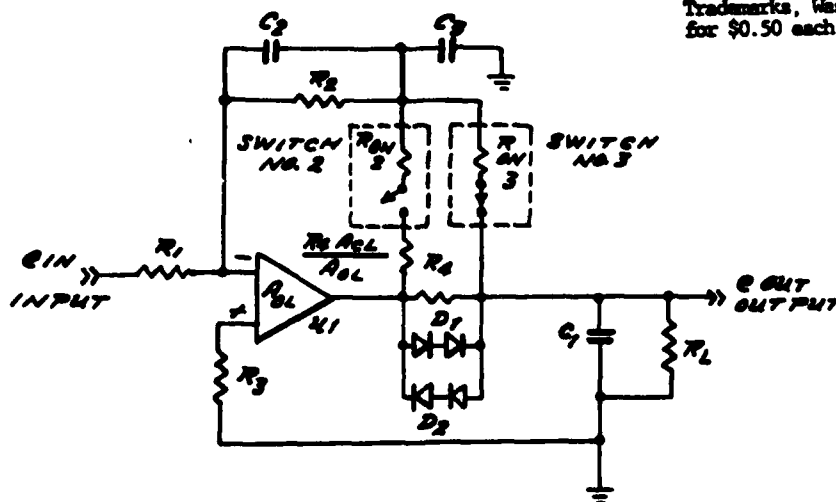
3,516,002 6/1970 Hillis ..... 307/253  
3,696,305 10/1972 Mitchell ..... 307/253  
3,781,697 12/1973 Bruinshorst et al. .... 328/167

Faster switching speeds for switchable noise filters and faster sampling speeds for sample and hold circuits are realized by means of an operational amplifier driven circuit in which excess feedback loop gain of the operational amplifier is used to reduce the effective value of resistance in the device's capacitor charging circuit. Two operational feedback loops are used, one or the other of which is switched into the circuit to effect either an open loop or a closed loop condition. The time required to charge the device's capacitor is a function of the ratio of the operational amplifier's closed loop gain divided by its open loop gain.

8 Claims, 9 Drawing Figures

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1900 Half Street S.W. Wash., DC 20324

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**A**BSTRACT

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**United States Patent** [19]

[11] **4,324,830**

**Bilow**

[45] **Apr. 13, 1982**

[54] **DIETHYNYLBENZENE-ETHYLNILPY-  
RENE COPOLYMERS**

[56]

**References Cited**

**U.S. PATENT DOCUMENTS**

3,705,131 12/1972 Korshak et al. .... 260/47 A  
3,926,897 12/1975 Cessna ..... 260/32.8 R  
3,926,907 12/1975 Engle ..... 260/45.7 P  
3,993,711 11/1976 Watson ..... 260/874

*Primary Examiner*—James J. Bell

*Attorney, Agent, or Firm*—Donald J. Singer; William J.  
O'Brien

[57]

**ABSTRACT**

A high char yielding matrix resin for use in fabricating carbon-carbon composites comprised of a polymerizable mixture of a diethynylbenzene monomer and an ethynylpyrene monomer.

**4 Claims, No Drawings**

[75] **Inventor:** Norman Bilow, Encino, Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 207,829

[22] **Filed:** Nov. 17, 1980

[51] **Int. Cl.<sup>3</sup>** ..... B32B 7/00

[52] **U.S. Cl.** ..... 428/257; 428/260;  
428/408; 523/179

[58] **Field of Search** ..... 428/245, 260, 408, 257,  
428/367; 260/42.17, 42.43

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**FROM THE AIR FORCE SYSTEMS COMMAND**

## United States Patent [19]

**[11] 4,323,851**

Shedd et al.

[45] Apr. 6, 1982

**[54] WIDE RANGE MULTIPLE TIME MARK GENERATOR**

**[56] References Cited**  
**U.S. PATENT DOCUMENTS**

**[75] Inventors:** Walter M. Shedd, Acton; Donald C. LaPierre, West Acton, both of Mass.

3,383,525	5/1968	Arksey .....	307/269
3,564,426	2/1971	Anderson et al. ....	328/48

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

**Primary Examiner—David K. Moore**  
**Attorney, Agent, or Firm—Donald J. Singer, Henry S. Miller**

[21] Appl. No.: 128,345

[57] **ABSTRACT**

[22] Filed: Mar. 7, 1960

A time pulse generator producing selectively, singular or multiple output pulses over a range from 1 sec to 10 seconds with provision for preselected reset. Additional features include an output for all pulses, an output increasing as the sum of the number of output pulses increase, and a blanking output pulse adapted to control the duration of a cathode raybeam in an oscilloscope application.

[51] Int. Cl.<sup>3</sup> ..... H03K 17/00

[52] U.S. Cl. .... 328/72; 328/48;

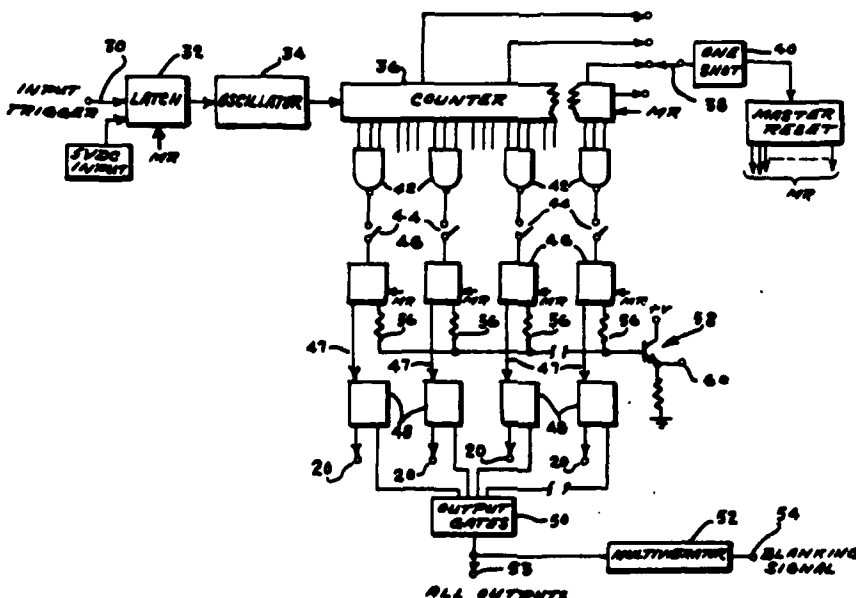
328/129

**[58] Field of Search** ..... 328/129, 48, 62, 72

**10 Claims, 3 Drawing Figures**

Requests for licensing information should be addressed  
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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,324,671**

**Christian et al.**

[45] **Apr. 13, 1982**

[54] **GREASE COMPOSITIONS BASED ON  
FLUORINATED POLYSILOXANES**

[75] **Inventors:** John B. Christian, Yellow Springs;  
Christ Tamborski, Dayton, both of  
Ohio

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 233,277

[22] **Filed:** Feb. 10, 1981

## Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 100,180, Dec. 4, 1979,  
abandoned.

[51] **Int. Cl.** ..... C10M 1/32; C10M 1/50

[52] **U.S. Cl.** ..... 252/49.6; 252/51.5 R;  
252/390; 252/58

[58] **Field of Search** ..... 252/49.6, 50, 51, 51.5 R,  
252/58, 390, 392; 548/330

## [56] References Cited

### U.S. PATENT DOCUMENTS

2,961,425	11/1960	Pierce et al.	260/46.5
3,088,910	5/1963	Rudel et al.	252/32.5
3,642,626	2/1972	Christian	252/33.6
3,849,433	11/1974	Butula	260/308 B
4,040,968	8/1977	Harris	252/51.5 A
4,071,439	1/1978	Cohen et al.	252/51.5 R
4,132,660	1/1979	Christian et al.	252/51.5 R
4,185,965	1/1980	Schlicht et al.	252/51.5 R
4,267,348	5/1981	Tamborski et al.	548/330

**Primary Examiner**—Patrick Garvin

**Assistant Examiner**—Jacqueline V. Howard

**Attorney, Agent, or Firm**—Donald J. Singer; William J.  
O'Brien

## [57] ABSTRACT

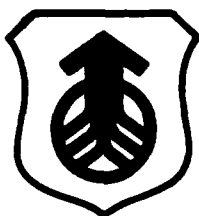
An antirust, anticorrosion grease composition comprising a major amount of a fluorinated polysiloxane base fluid, a minor amount of a fluorocarbon polymer thickening agent, and a rust and corrosion inhibiting amount of a benzimidazole.

14 Claims, No Drawings

Requests for licensing information should be addressed  
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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,324,758**

**Eisentraut et al.**

[45] **Apr. 13, 1982**

[54] **ANALYSIS OF LUBRICATING OILS FOR IRON CONTENT**

[75] **Inventors:** Kent J. Eisentraut, Xenia; William D. Ross, Eaton; William J. Hillan, Kettering; Joseph J. Brooks, Centerville, all of Ohio; Thomas G. Duffy, Jacksonville, Fla.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 141,500

[22] **Filed:** Apr. 18, 1980

## Related U.S. Application Data

[62] **Division of Ser. No. 29,586, Apr. 12, 1979, Pat. No. 4,238,197.**

[51] **Int. Cl.** ..... G01N 33/28

[52] **U.S. Cl.** ..... 422/61; 141/100; 141/104; 222/144; 422/68

[58] **Field of Search** ..... 422/61, 64, 68; 141/9, 141/100, 104, 284; 128/218 R, 218 G, 218 M; 222/135, 144

[56] **References Cited**

## U.S. PATENT DOCUMENTS

2,768,879 10/1956 Hewson ..... 422/64  
3,223,485 12/1965 Ferrari et al. .... 422/64

3,594,129 7/1971 Jones ..... 422/64  
3,713,779 1/1973 Sirago et al. .... 422/61  
3,715,189 2/1973 Nighohossian et al. .... 422/61  
4,203,725 5/1980 Snowden et al. .... 422/61 X  
4,225,558 9/1980 Peterson et al. .... 422/61 X

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322364 11/1972 U.S.S.R. .... 23/230 M

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Daus, L. L., "Examination of Used Crankcase Oil", Refined & Natural Gasoline Manufacturer, vol. 21, No. 4, 4/42, pp. 63-66482.

**Primary Examiner**—Barry Richman  
**Attorney, Agent, or Firm**—Donald J. Singer; William J. O'Brien

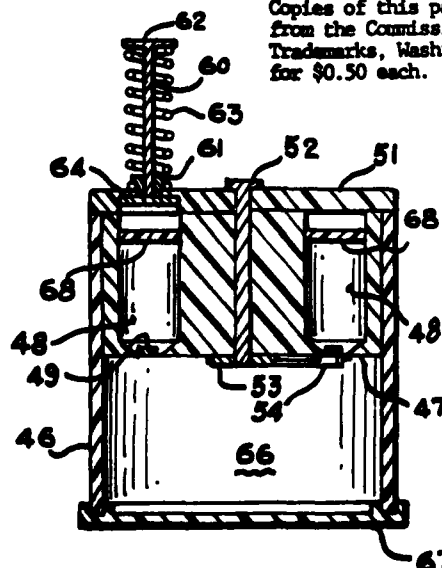
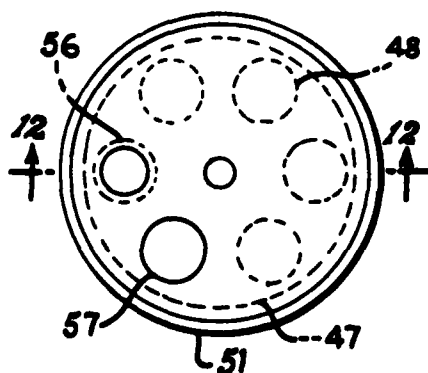
## [57] ABSTRACT

An apparatus for analyzing a used lubricating oil for iron wear metal content which comprises a series of containers, at least one of which is adapted for holding a test sample material while the remaining containers are adapted for holding 3 separate reagent sample materials. Also included are a reaction chamber, means for transferring the test sample material and the reagent materials from the series of containers to the reaction chamber which may also function as a test cell.

**2 Claims, 17 Drawing Figures**

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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,325,140

Stitzer

[45] Apr. 13, 1982

[54] FULL DUPLEX COMMUNICATION SYSTEM  
APPARATUS USING FREQUENCY  
SELECTIVE LIMITERS

[56]

## References Cited

### U.S. PATENT DOCUMENTS

3,082,383	3/1963	Stern	333/1.1
3,095,561	6/1963	Hubka	455/84 X
3,641,433	2/1972	Mittin et al.	455/19 X
3,987,396	10/1976	Kreger	455/19
4,044,357	8/1977	Goldie	333/17 L X
4,134,068	1/1979	Richardson	455/19
4,155,039	5/1979	Lechevin	455/53

[75] Inventor: Steven N. Stitzer, Ellicott City, Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the Air  
Force, Washington, D.C.

[21] Appl. No.: 129,860

[22] Filed: Mar. 13, 1980

### Related U.S. Application Data

[63] Continuation of Ser. No. 949,367, Oct. 6, 1978, abandoned.

[51] Int. Cl.<sup>3</sup> ..... H04B 1/50

[52] U.S. Cl. .... 455/19; 333/17 L;  
370/26; 370/38; 455/86

[58] Field of Search ..... 370/26, 38, 39; 455/14,  
455/19, 21, 24; 333/1.1, 17 L

## OTHER PUBLICATIONS

Stitzer et al., *X-Band YIG Limiters for FM/CW Radar*,  
The Microwave Journal, Dec. 1977, vol. 20, No. 12.

Primary Examiner—Paul L. Gensler  
Attorney, Agent, or Firm—Donald J. Singer; William  
Stepanishen

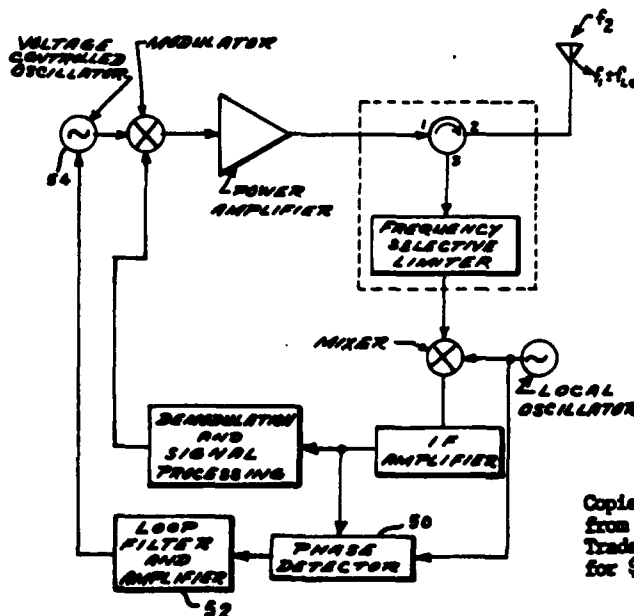
[57]

## ABSTRACT

A microwave duplexer apparatus utilizing a frequency selective limiter unit in conjunction with a microwave circulator to direct RF energy from a transmitter to an antenna and from an antenna to a receiver in a single antenna duplex communication system.

6 Claims, 5 Drawing Figures

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# PATENT ABSTRACT

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FROM THE AIR FORCE SYSTEMS COMMAND

United States Patent [19]

[11] 4,325,697

Regan et al.

[45] Apr. 20, 1982

[54] METHOD AND APPARATUS FOR  
MEASURING HAND-EYE COORDINATION  
WHILE TRACKING A CHANGING SIZE  
IMAGE

[75] Inventors: David M. Regan; Kenneth I. Beverley,  
both of Halifax, Canada

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 193,048

[22] Filed: Oct. 2, 1980

[51] Int. Cl.<sup>3</sup> ..... G09B 5/00

[52] U.S. Cl. .... 434/258

[58] Field of Search ..... 434/258; 273/1 GC, 1 GE

[56] References Cited

## U.S. PATENT DOCUMENTS

3,357,115	12/1967	Kelley	434/258
3,483,302	12/1969	Ashkenas et al.	434/258
3,579,865	5/1971	Walker	434/258
3,971,143	7/1976	Slomski	434/258
4,028,819	6/1977	Walker	434/258
4,169,592	10/1979	Hall	434/258 X

Primary Examiner—William H. Grieb

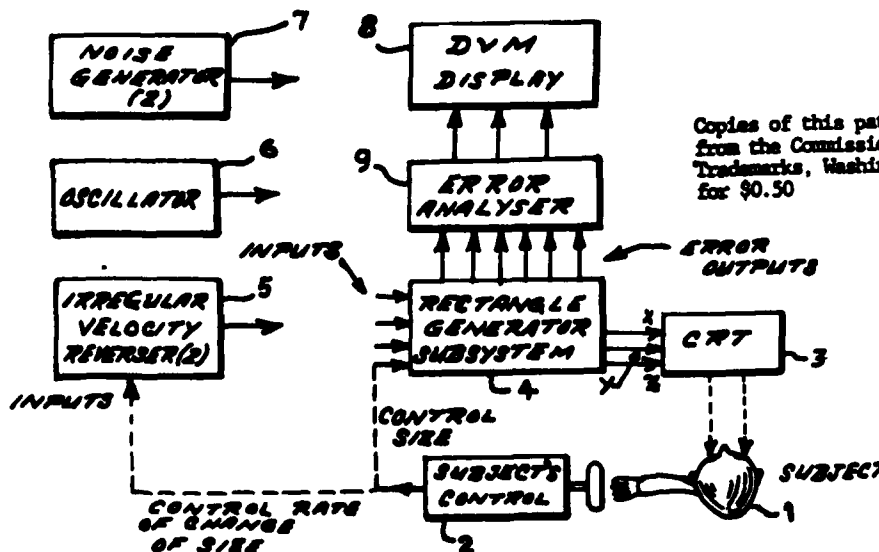
19 Claims, 28 Drawing Figures

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Half Street S.W. Wash., DC 20324

Attorney, Agent, or Firm—Donald J. Singer; Willard R. Matthews

## ABSTRACT

Hand-eye coordination while tracking a changing size image is measured by a method that includes: displaying an image that is varied in size in response to a programmed signal; having the person under test manipulate a manual control that effects image size change by cancelling the effects of the programmed signal; and, comparing the tracking response with the image size change, the difference therebetween being a measure of the subjects' hand-eye coordination. The image can be randomly displaced laterally during test and its light intensity parameters can be varied. Image size change is programmed in various ways including randomly occurring reversals in direction of change. The method is implemented by means of an image figure generator that provides a rectangular image on the screen of a CRT. A programmable image size change circuit controls the size of the rectangle in concert with a potentiometer circuit that is manually controlled by the test subject. Other electronic circuits provide for lateral displacement of the image, image/screen intensity changes and the processing and display of tracking errors.



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,327,306

Stratton et al.

[45] Apr. 27, 1982

- [54] FACE PLATE FOR CATHODE RAY TUBE
- [75] Inventors: Roy F. Stratton, Oriskany; Edward J. Calucci, Syracuse, both of N.Y.
- [73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

3,789,259 1/1974 Allen .  
3,818,131 6/1974 Emmons .  
3,984,842 10/1976 Meltzer et al. .  
3,994,000 11/1976 Trainor et al. . 346/160  
4,026,642 5/1977 Tanaka et al. . 355/1

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"A Fundamental Study of the Electromagnetic Properties of Advanced Composite Materials," by W. J. Gajda, Phase Report RADC-TR-78-158, Jul. 1978, Part (5) Boron Fibers, pp. 19-31.

Primary Examiner—Palmer C. Demeo  
Attorney, Agent, or Firm—Donald J. Singer; William J. O'Brien

- [21] Appl. No.: 97,596
- [22] Filed: Nov. 27, 1979
- [51] Int. Cl. H01J 31/02; H01J 29/86
- [52] U.S. Cl. 313/419; 313/477 R
- [58] Field of Search 313/475, 419, 398, 477

## References Cited

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3,609,233 9/1971 Nagao .  
3,717,531 2/1973 Smith . 350/96.24 X  
3,732,367 5/1973 Teranishi et al. .

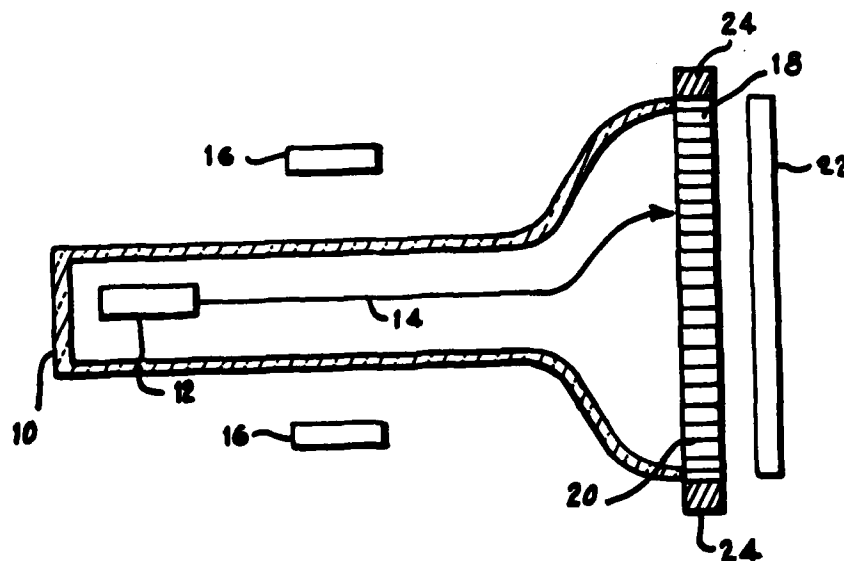
## ABSTRACT

A cathode ray tube having a face plate composed of a plurality of boron fibers which act as a charge transfer medium to make signals accessible from the outside of the tube for further manipulation and processing.

4 Claims, 1 Drawing Figure

Requests for licensing information should be addressed to: U.S. Department of the Air Force AF/JACP  
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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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United States Patent [19]

Karas

[11] 4,327,358

[45] Apr. 27, 1982

[54] **PHYSICAL DETERRENT BARRIER WITH  
UPWARD LOOKING DETECTION SENSOR  
FOR INTRUDER DETECTION SYSTEM**

[75] Inventor: Nicholas V. Karas, Lowell, Mass.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 126,073

[22] Filed: Feb. 29, 1980

[51] Int. Cl.<sup>1</sup> ..... G08B 13/18; H01P 3/10

[52] U.S. Cl. .... 340/541; 340/564;  
340/565; 333/237; 343/771; 343/5 PD

[58] Field of Search ..... 340/541, 540, 564-567,  
340/550-554, 561; 343/770, 771, 760, 762, 5  
P.D., 18 C; 333/237

[56] References Cited

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3,560,970 2/1971 Kamimura et al. .... 343/771

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"Reflector Type Antennas", J. D. Kram, McGraw Hill, 1950 pp 326-336.

Primary Examiner—John W. Caldwell, Sr.

Assistant Examiner—Donnie L. Crosland

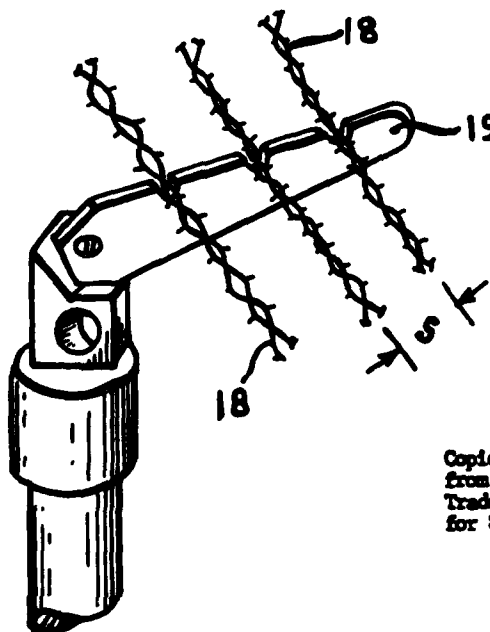
Attorney, Agent, or Firm—Donald J. Singer; Willard R. Matthews, Jr.

## [57] ABSTRACT

A physical deterrent barrier is utilized as an integral part of an intruder detection sensor that provides surveillance of intrusions in the air space over the barrier. The sensor is a corner reflecting antenna that is coextensive with and mounts on the top of the barrier and is integrated into a barbed wire topped chain link fence by arranging appropriately spaced parallel strands of barbed wire into a V configuration so as to effect an electrical corner reflector at the system operating frequency.

5 Claims, 9 Drawing Figures

Requests for licensing information should be addressed  
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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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**United States Patent** [19]

[11] **4,327,868**

**Burkes, Jr.**

[45] **May 4, 1982**

[54] **SWING DISC NOZZLE STRUCTURE FOR  
RAMJET ENGINE**

[56]

**References Cited**

**U.S. PATENT DOCUMENTS**

[75] **Inventor:** William M. Burkes, Jr., McGregor,  
Tex.

3,659,789	5/1972	Schultz	239/265.19
3,853,586	12/1974	Olcott	239/265.11
3,929,289	12/1975	Kardon et al.	239/265.11
3,940,067	2/1976	Cherry et al.	239/265.11
3,970,253	7/1976	Burkes et al.	239/265.19

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

**Primary Examiner**—Stephen C. Bentley  
**Attorney, Agent, or Firm**—Donald J. Singer; William J.  
O'Brien

[21] **Appl. No.:** 43,535

[57]

**ABSTRACT**

[22] **Filed:** May 29, 1979

A ramjet, swing disc, variable nozzle structure with  
corrosive resistant, coated graphite inserts positioned  
within oppositely disposed recesses in the swing disc  
structure.

[51] **Int. Cl.:** F02K 9/36

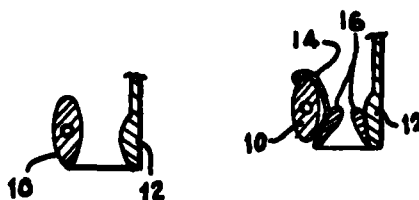
[52] **U.S. Cl.:** 239/265.15; 239/265.19;

239/265.33

[58] **Field of Search:** 60/270 R, 270 S;  
239/265.11, 265.19, 265.33, 265.37, 265.15

**4 Claims, 6 Drawing Figures**

Requests for licensing information should be addressed  
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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,327,884

Lawhorn

[45] May 4, 1982

- [54] ADVANCED AIR-TO-SURFACE WEAPON  
[75] Inventor: William S. Lawhorn, Rockwall, Tex.  
[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

1027919 4/1966 United Kingdom ..... 102/69

## OTHER PUBLICATIONS

"Modular Weapons", by Hendricks Weapons Technology Ordance, Jan., Feb. 1973.  
The Aerodynamic Design of Aircraft, 1978, pp. 71-77.

Primary Examiner—Harold J. Tudor  
Attorney, Agent, or Firm—Donald J. Singer; Arsen Tashjian

- [21] Appl. No.: 114,533  
[22] Filed: Jan. 23, 1980  
[51] Int. Cl.<sup>3</sup> ..... F41G 7/00; F42B 15/02;  
F42B 15/16  
[52] U.S. Cl. .... 244/3.1; 102/374;  
102/436; 244/3.24  
[58] Field Search ..... 244/3.24, 3.1, 3.22,  
244/3.15, 130, 32; 102/38 NC, 69, 92.1-92.7,  
DIG. 7, 49.3, 436, 489, 374, 501

## [57] ABSTRACT

An unconventional advanced air-to-surface weapon of monowing configuration, and having a symmetrical, high lift fuselage of lenticular (i.e., biconvex or oblate) cross section, with a width-to-thickness fineness of approximately 2.5. The longitudinal profile is modified Sears-Haack in two dimensions, truncated at the base for a rocket nozzle. The weapon comprises a nose portion modular forebody, a weapon payload portion modular midbody, and an aft boattail modular portion which are combined into one unit that is selectively separable into its modular components when used. A variation of this weapon is also taught which features a semi-lenticular fuselage cross section (i.e., one flat side) and a width-to-thickness fineness of approximately 2.1.

## [56] References Cited

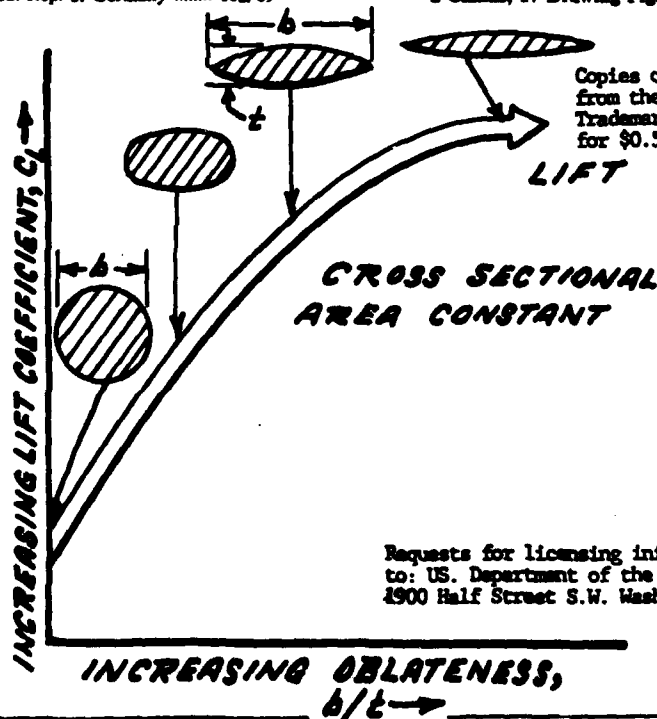
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### FOREIGN PATENT DOCUMENTS

- 2609590 9/1977 Fed. Rep. of Germany ..... 102/69

2 Claims, 17 Drawing Figures



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United States Patent [19]

[11] 4,329,643

Neumann et al.

[45] May 11, 1982

[54] PORTABLE CIRCUIT TESTING SYSTEM

[56]

## References Cited

### U.S. PATENT DOCUMENTS

3,808,532 4/1974 Yuska ..... 324/158 F  
4,230,986 10/1980 Deaver et al. .... 324/158 F

Primary Examiner—Ernest F. Karlson  
Attorney, Agent, or Firm—Donald J. Singer; Henry S. Miller

[57]

## ABSTRACT

A portable system for testing and adjusting security alarm system modules where an alarm module is removed from the security system and inserted into the test system, an adapter card, connected to the test system, replaces the module, whereby the alarm system continues to function normally, the alarm circuit is then tested for voltage, current and continuity and necessary adjustments made.

4 Claims, 3 Drawing Figures

[76] Inventors: Manfred H. Neumann, Michel  
Klinitz Weg 17, 100 Berlin 47;  
Günter H. Wallstab, Planufer 92E,  
1000 Berlin 61; Lutz R. Heike,  
Kaiserin Augusta Allee 36, 1000  
Berlin 10; Frank U. Zimmerman,  
Tacitusstr. 12A, 1000 Berlin 42, all of  
Fed. Rep. of Germany; Lawrence A.  
Durante, Box 44, APO, N.Y. 09611

[21] Appl. No.: 129,859

[22] Filed: Mar. 13, 1980

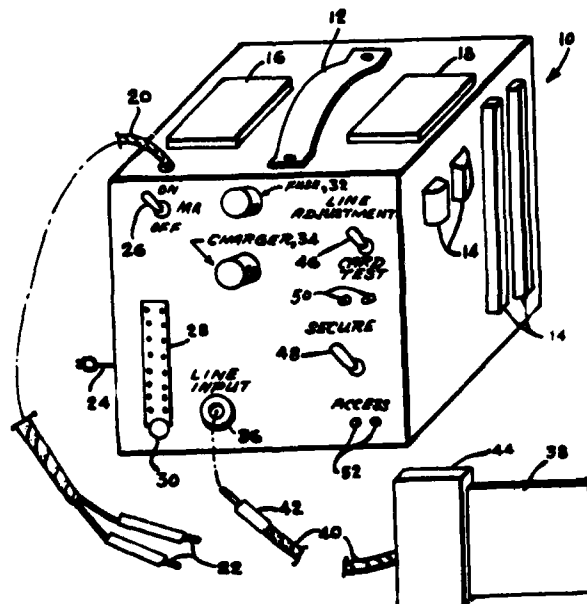
[51] Int. Cl.<sup>3</sup> ..... G01R 31/02; G08B 29/00

[52] U.S. Cl. .... 324/158 F; 340/514

[58] Field of Search ..... 324/158 F, 158 R, 73 R;  
340/514

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# PATENT ABSTRACT

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**United States Patent** [19]  
**Goldie**

[11] **4,329,688**  
[45] **May 11, 1982**

[54] **SIGNAL INJECTION CIRCUIT FOR RADAR  
GAIN AND NOISE TESTS**

[75] **Inventor:** Harry Goldie, Randallstown, Md.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 119,345

[22] **Filed:** Feb. 7, 1980

[51] **Int. Cl.:** G01S 7/40; G01S 13/00

[52] **U.S. Cl.:** 343/17.7; 434/2

[58] **Field of Search:** 434/2; 343/17.7

[56] **References Cited**  
**U.S. PATENT DOCUMENTS**

4,053,890 10/1977 Woodson et al. 343/17.7

*Primary Examiner*—S. C. Buczinski  
*Attorney, Agent, or Firm*—Donald J. Singer; Willard  
Matthews, Jr.

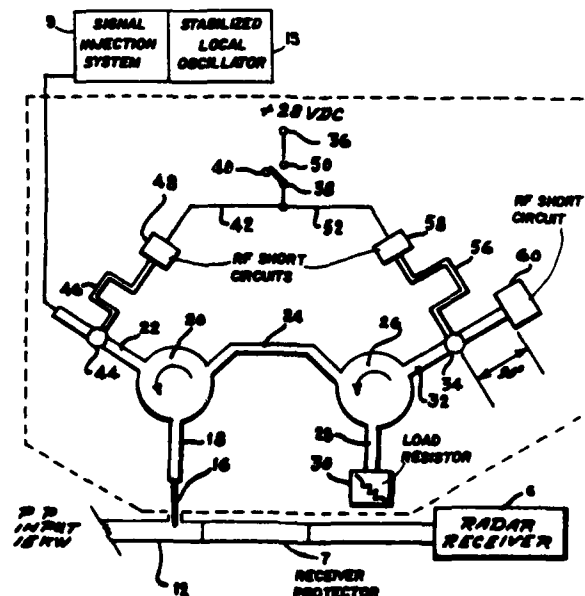
[57] **ABSTRACT**

A circuit injects the signal from a stable localized oscillator past a pin diode switch through a first circulator to a waveguide, a second circuit injects a noise signal from a generating diode through a second circulator to the first circulator to the waveguide, a switching system causes the diodes to function in a coordinated manner.

**6 Claims, 2 Drawing Figures**

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**United States Patent** [19]

[11] **4,330,211**

**Peterson et al.**

[45] **May 18, 1982**

[54] **METHOD AND APPARATUS FOR  
DETECTING SMALL ANGULAR BEAM  
DEVIATIONS**

[75] **Inventors:** Phillip R. Peterson; Athanasios  
Gavrielides, both of Albuquerque, N.  
Mex.; John H. Erkkila, Dayton, Ohio

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 128,344

[22] **Filed:** Mar. 7, 1980

[51] **Int. Cl.:** G01B 9/02

[52] **U.S. Cl.:** 356/354; 350/162 R;  
356/363

[58] **Field of Search:** 356/354, 355, 356, 363

[56] **References Cited**

## U.S. PATENT DOCUMENTS

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3,861,801	1/1975	Peters et al.	350/162 R X
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*JOSA*, vol. 42, No. 4, pp. 269-276, 4/52.

Palmer et al., "Diffraction Grating Anomalies, II,  
Coarse Gratings", *JOSA*, vol. 46, No. 1, pp. 50-53, 1/56.

Hessel et al., "A New Theory of Wood's Anomalies on  
Optical Background Information Gratings", *Applied  
Optics*, vol. 4, No. 10, pp. 1275-1297, 10/65.

**Primary Examiner**—John K. Corbin

**Assistant Examiner**—Matthew W. Koren

**Attorney, Agent, or Firm**—Donald J. Singer; Jacob N.  
Erlach

[57]

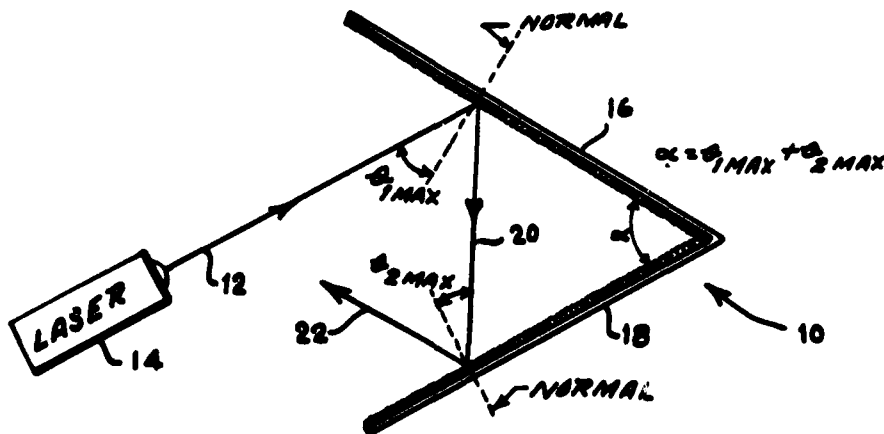
## ABSTRACT

A method and apparatus for detecting small angular  
deviations of an input beam which utilizes a pair of  
diffraction gratings in series, both of which are operat-  
ing in the Wood's anomaly region. As a result, the out-  
put intensity of the doubly diffracted input beam is at a  
maximum. Any deviation from the Wood's anomaly  
region by the input beam will substantially reduce the  
intensity of the output. This intensity variance is de-  
tected and utilized as an indication of a small angular  
deviation of the input beam.

10 Claims, 5 Drawing Figures

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**United States Patent** [19]  
**Allinikov**

[11] **4,331,871**  
[45] **May 25, 1982**

[54] **FLUORESCENT DETECTION OF FLAWS**

[75] **Inventor:** Sidney Allinikov, Yellow Springs, Ohio

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 141,522

[22] **Filed:** Apr. 17, 1980

**Related U.S. Application Data**

[62] **Division of Ser. No. 76,631, Sep. 18, 1979, Pat. No. 4,273,671.**

[51] **Int. Cl.** ..... C09K 3/00

[52] **U.S. Cl.** ..... 250/302

[58] **Field of Search** ..... 250/302; 252/65.52, 252/65.54, 301.19

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

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3,485,758 12/1969 Borucki et al. .... 252/62.54

**Primary Examiner**—Bruce C. Anderson  
**Attorney, Agent, or Firm**—Donald J. Singer

[57] **ABSTRACT**

In a method for detecting flaws in the surface of a work-piece, initially microcapsules containing a fluorescent dye are deposited on the surface. After removal of excess microcapsules from the surface in order to reduce background fluorescence, the surface is visually inspected under ultraviolet light. The method overcomes many of the disadvantages of conventional inspection procedures, e.g., by eliminating use of emulsifiers and by materially shortening processing time.

**10 Claims, No Drawings**

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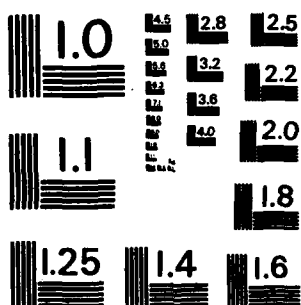
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United States Patent [19]

[11] 4,331,933

Allan et al.

[45] May 25, 1982

[54] MICROWAVE POWER LEVEL  
STABILIZING CIRCUIT FOR CESIUM BEAM  
FREQUENCY STANDARDS

[75] Inventors: David W. Allan, Boulder, Colo.; R.  
Michael Garvey, Swampscott, Mass.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 161,185

[22] Filed: Jan. 19, 1980

## Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 926,059, Jul. 19, 1978,  
abandoned.

[51] Int. Cl.<sup>3</sup> ..... H03L 7/26

[52] U.S. Cl. .... 331/3; 331/94.1

[58] Field of Search ..... 331/3, 94

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ties in Cesium Beam Freq. Standards", Proc. of the 31st  
Annual Symposium on Freq. Control; Jun. 1977; pp.  
555-561, distributed 10/24/77.

Primary Examiner—Siegfried H. Grimm  
Assistant Examiner—Edward P. Westin  
Attorney, Agent, or Firm—Donald J. Singer; Willard R.  
Matthews

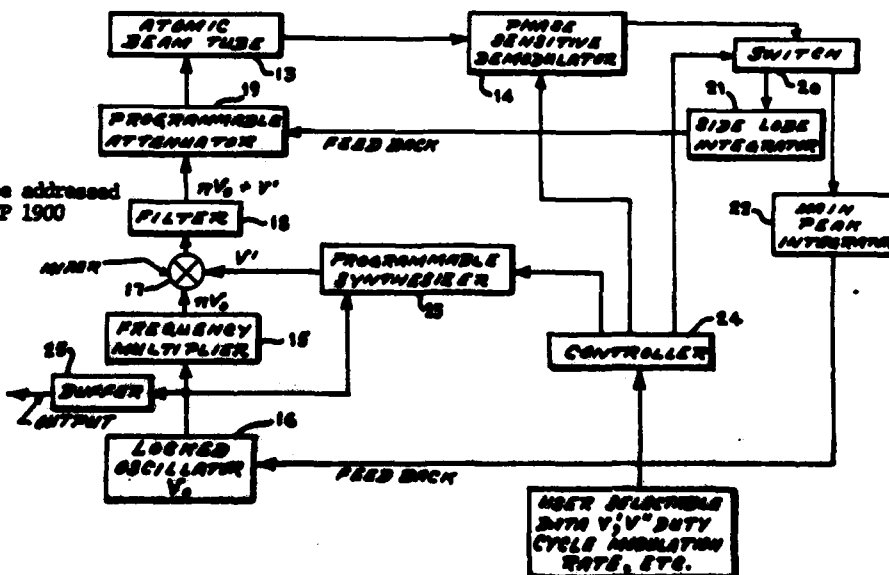
## [57] ABSTRACT

Perceived atomic resonance frequency error resulting from microwave power level changes in atomic clocks is eliminated by controlling the device's microwave power source output in response to deviations from a fixed frequency relationship between the main atomic peak and a sidelobe peak of the atomic beam frequency spectrum. This is accomplished by a microwave power control servo system that includes a time sharing interrogation circuit for detecting and monitoring the frequencies of the main atomic peak and the sidelobe peak and a comparator that compares the frequencies of the main atomic and sidelobe peaks and generates a feedback control signal in response to frequency differences between the two that deviate from a fixed difference frequency. The feedback signal is used to control the microwave power source output in a manner that constrains the main atomic peak and the sidelobe peak at a fixed offset frequency.

5 Claims, 6 Drawing Figures

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United States Patent [19]

[11] 4,331,936

Schlesinger et al.

[45] May 25, 1982

[54] FREE ELECTRON LASER EMPLOYING AN EXPANDED HOLLOW INTENSE ELECTRON BEAM AND PERIODIC RADIAL MAGNETIC FIELD

[75] Inventors: S. Perry Schlesinger; Thomas C. Marshall; David B. McDermott, all of New York, N.Y.; Victor L. Granatstein, Silver Spring, Md.; Robert K. Parker, Alexandria, Va.; Phillip A. Sprangle, Silver Spring, Md.; Philip C. Eftimion, Princeton Junction, N.J.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 92,801

[22] Filed: Nov. 9, 1979

[51] Int. Cl.<sup>3</sup> ..... H01S 3/09

[52] U.S. Cl. .... 372/2; 372/37; 372/20; 372/26

[58] Field of Search ..... 331/94.5 P, 94.5 PE, 331/94.5 C, 94.5 D

[56] References Cited

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3,958,189 5/1976 Sprangle et al. .... 331/94.5 PE

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"Multiple Gas E-Beam Pumped Lasers", by Dreyfus, *IBM Tech. Dis. Bull.*, vol. 22, No. 9, (Feb. 78).

"Shock-Wave Introduction of Gas Into Relativistic E-Beam Pumped Lasers and Drift Tubes", *App. Phys. Lett.*, vol. 29, No. 6, pp. 348-350, (Sep. 15, 1976).

Primary Examiner—William L. Sikes

Assistant Examiner—Leon Scott, Jr.

Attorney, Agent, or Firm—Donald J. Singer; Willard R. Matthews, Jr.

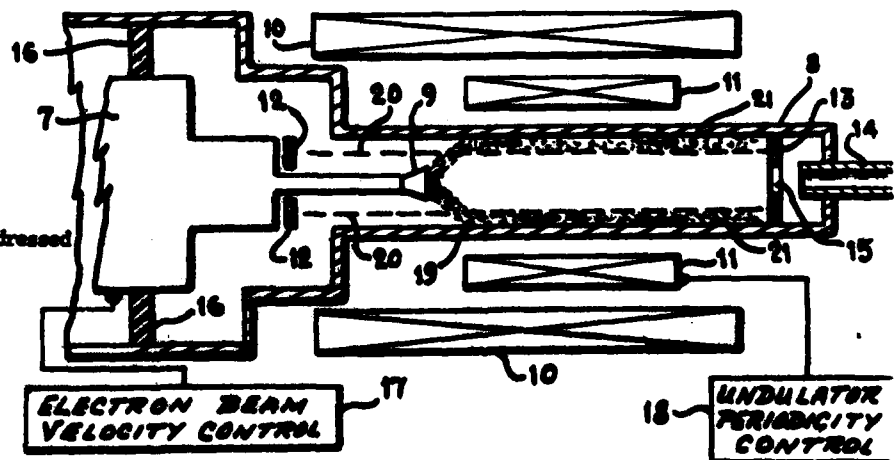
## [57] ABSTRACT

The generation of very high power pulses of coherent electromagnetic radiation that are continuously tunable in frequency is accomplished by means of a free electron laser in which a hollow relativistic electron beam is projected along the longitudinal axis of an evacuated drift tube. A first magnetic field expands the electron beam into an annular peripheral interaction region of the drift tube where the beam interacts with a second periodic radial magnetic field. Frequency is varied by changing the electron velocity of the electron beam or by changing the periodicity of the radial magnetic field. The device can be made to operate as an oscillator by the inclusion of resonant cavity defining mirrors within the interaction region, or as an amplifier by injecting a coherent radiation signal into the interaction region. Both oscillator and amplifier functions can be incorporated into a single device. Linewidth is narrowed by utilizing a Smith-Fox interferometer to couple the generated coherent radiation into an output light pipe.

9 Claims, 6 Drawing Figures

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